The Journal of Experimental Education

A periodical report of scientific investigations relating to child development, curriculum, learning, teaching, supervision, measurements, statistics, and experimental techniques.

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Journal of Experimental Education

Volume XXII December, 1953 Number 2

A STUDY OF CERTAIN EFFECTS OF THREE TYPES OF LEARNING EXPERIENCES IN ART AS REVEALED IN THE DRAWINGS BY PARTICIPANTS*

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SECTION I

DEFINITION AND IMPORTANCE OF THE PROBLEM

IT IS THE purpose of this investigation to compare the relative effects of three different art experiences in drawings made in three specific problem situations. Since the drawings resulting from the three different art experiences were put together for the evaluation of all drawings, numerically equal groups were used, with personnel assigned to each group by random number. Beyond this, common action themes for all groups allowed comparison of drawings without regard for the conditions under which the drawings were made.

With the common problem of creating a drawing on an action theme the three groups were provided with varying amounts and kinds of sensory data as follows:

Control Group (X)—With no sensory material provided beyond that in the classroom, following the oral presentation of the action theme, this group created a drawing.

Experimental Group 1 (Y)—After oral presentation of the action theme, followed by presentation of a sound color film containing sensory material relevant to the subject matter of the action theme, this group, in the classroom environment, created a drawing on the action theme.

Experimental Group 2 (Z)—After oral presentation of the action theme, and with a resource person at the site of the field trip to supply supplementary information, this group, in the field trip environment where sensory material relevant to the subject matter of the action theme was present, created a drawing on the action theme.

Three different action themes were selected with an attempt being made to 'choose the subject matter' from the categories of 'machines', 'animals', and 'people'. An action theme was used, rather than a one word subject theme, because it was thought that this would offer the student more of a challenge, and give more opportunity for creative expression of unique, individual nature. The three action themes on which all individuals of the three groups made drawings, are as follows:

1. "Fire Engines Going to a Fire"
2. "Activity in the Lion Cage"
3. "Active Children in a Country School"

The experimental method of research was used, with three college classes in Art. The three groups were taken from art classes inasmuch as:

a. More directed interest is achieved in this way.
b. Some proficiency is needed by the students in the interpretation of sensory data.
c. Some proficiency is needed in the handling of materials.

On a theoretical level, the study rises out of

* A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, University of Wisconsin, 1951, A. S. Barr, advisor.

the current need to plan learning experiences wisely, and use available time effectively to give maximum results. In a discussion of the functional art program, Hawley* recommends that the program must grow out of, and grow with all other learning experiences, and she emphasizes the necessity of reaching a greater number of students. She also stressed the fact that during any one day there are many varied opportunities for art enjoyment and appreciation of form, line, color, and texture, which may be realized through observation and manipulation. Either manipulation or observation provides real art experience which is vital and functional because of a felt need, recognized through personal contact by the individual with an actual art situation.

The assumptions basic to this investigation are as follows:

1. Certain experiences in the learning situation are more meaningful to the individual than others, because,
   a. Where a certain commonality of experience exists, these appear to be more naturally within the experience of the individual.
   b. The 'doing' is intriguing and interesting.
   c. These experiences are in harmony with professed beliefs.
   d. These experiences appear to offer the greatest potentialities for progress toward recognized goals.

2. In the process of evaluation a more valid judgment can be secured on the total worth of a drawing when attention is focused on a composite, rather than on isolated parts.

3. Each drawing must be regarded as an artificial form, since it is a graphic two dimensional interpretation of an individual experience.

The problems to be faced in the investigation, and the related assumptions suggest the following hypotheses:

1. For the maximum results from a problem situation, one must have the resources for coping with the situation at hand.
2. It is important for the individual, especially where sensory cues are utilized, to respond to the total situation, not to items of fragmentary nature.

Individuals were informed prior to making the drawings that these three questions would be asked of each drawing:

1. Are the forms clearly presented?
2. Does the drawing convey a message?
3. Do all parts function to give unity to the drawing?

The source, process of refinement, and validation of these statements of criteria are described in detail in Part A, Section II. In terms of the student making the drawing, the criteria were thought to be most functional in question form.

The evaluation of individual drawings was done by a jury of five college teachers in Art Education. Each member of the jury, working on all drawings of a single action theme, evaluated each drawing on its total merit. In making this evaluation the judges were aware of the criteria used by the students, but each was asked to use his own personal criteria of what constitutes merit in a drawing. These personal statements of criteria were submitted to the investigator, and are listed in Part A, Section II. Except for knowing that all drawings judged in a series were made by members of one class, the members of the jury were not informed as to the identity of individuals who made the drawings, or the conditions under which the drawings were made. A committee of five instructors in Art Education at the University of Wisconsin served as the jury that evaluated the drawings in this investigation.

To establish the reliability of the evaluation of drawings, the judges re-evaluated one complete action theme after a two month time interval.

A functional curriculum in the modern school has no place for Art as an isolated subject, or for any subject which attempts to exist as an entity independent of life. One criterion of the effectiveness of a subject area such as Art is the extent to which activities and experiences are tied to everyday life. Art has been defined in many ways, and any definition, to be acceptable, must serve our contemporary society. The breadth of Art, and the necessity for its application are emphasized by Haggerty** in his definition of Art, which is as follows:

> The outward activities and inward experiences that are called art are the efforts of human beings to make life more interesting and more pleasing. Art objects which are the product of these activities and experiences are meaningful to the degree that they increase human enjoyment.

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* Cecelia L. Hawley, "Broadening Our Conceptions of Art Education," Education, LX (1939), pp. 134-137.

** Melvin W. Haggerty, Art A Way of Life (Minneaplis: University of Minnesota Press, 1935).

That some experiences in Art Education are more valuable than others for the achievement of specific desired outcomes has been expressed by many writers in the field. However, there is little experimental evidence from investigations where art experiences have been compared, to show definite statistical advantage of one type of art experience over another.

A distinctive aspect of this investigation is that a problem was presented in each teaching situation, and the individual had opportunity to respond with his total resources. As the learning experiences were set up, varying amounts of relevant subject matter were present in the three situations to increase the possibility of differences in the drawings. This system of evaluation permitted a comparison of achievement for the three groups, on each of three action themes.

An advocate of the type of creative expression where no sensory data is supplied, or of the motion picture, or of the field trip may claim certain benefits of his particular type of activity for the production of drawings with merit. This investigation points out specifically the statistical achievement for each of the three art experiences, suggests advantages and disadvantages for each type of art experience, and offers areas for further investigation on this and related problems.

SECTION II

DESIGN OF THE INVESTIGATION

A. Sources of Data

THE GROUP making the drawings for this investigation consisted of 60 University of Wisconsin undergraduate students enrolled in three sections of the course offered in the Art Education Department entitled 50a (Basic Drawing). The course description for 50a, as stated in the University bulletin, is as follows: "Elementary principles of black and white media in study of still life and nature. Perspective and composition." The course 50a is a required course for students who have Art Education or Applied Arts as a special field. For students specializing in other fields, 50a is an elective course.

Supplementary information that helps to describe the group was collected through the use of a combined data sheet and questionnaire for each individual. (A summary of the findings from this source is given in the section on findings, Section III.)

From class rosters of the three sections of 50a, where the names of students appeared in the order that they had signed up for the course, on each of the three rosters the students were numbered consecutively as their names appeared. In this manner, each class was divided three ways, and three groups were organized. An individual assigned to a specific group, did all three drawing exercises in that group. The three groups resulting from this process were designated as follows: Control Group, Experimental Group 1, and Experimental Group 2.

Because of the manner in which the individuals were assigned to groups, plus the fact that each class was divided three ways, the assumption is made that this represents a random sample of the population that makes up the three sections of 50a. General makeup and characteristics of this group would allow the experimental findings to be applied widely to other groups.

It was thought best to construct a few simple statements to act as criteria for the drawings. The reasons for having criteria of this kind are two: 1) Beyond the original instructions that are given, these simple statements will more clearly indicate to each student the purpose and direction of this study; 2) because of the individual criteria to be used by each judge in the evaluation process, these initial criteria will serve as a point of departure from which judgment can be made.

The source, process of refinement, and validation for these criteria for the drawings is as follows: 1) Published materials in art education were consulted, including books, magazines, and periodicals, with special emphasis upon works most recently published. It seemed desirable to have simple statements that would be readily understood, general, yet applicable to this problem. 2) The resulting criteria were presented at a meeting where the teachers of the three drawing classes were present, and also the Chairman of the Art Education Department. Discussion of these statements of criteria led to further refinement and final crystallization in question form. 3) The three statements of criteria were accepted as valid for purposes of this investigation by the five members of the evaluation jury, at a preliminary meeting, held two weeks before the first evaluation of drawings was made. 4) Comparison of the three statements of criteria with the individual statements of criteria submitted by the five judges reveal no sharp conflicts.

Two weeks before the first evaluation of drawings was made the judges agreed to submit a series of statements that would outline each judge's concept of 'what constitutes merit in a drawing?' Since the judges preferred to do this in individual conferences, the investigator held individual conferences with each judge, wrote up the statements of criteria arrived at in the interview, and submitted this to each judge for possible changes or revisions. After the necessary changes and revisions, the individual criteria of the judges were in final form. While there is no detailed analysis intended within the province of this investigation, the things most commonly stressed as qualities of a good drawing (mentioned by two or more judges) appear to be: sound

organization, individual technique, interesting presentation of elements, careful rendering, space filling quality, ideas expressed readily, clear and articulate expression, sincere subjective presentation. Things that evidently detract from the merit of a drawing, according to these five judges, are: the inclusion of meaningless material, inadequate understanding of subject matter, inadequate grasp of line and perspective, lack of strength of line, evidence of imposed technique, and lack of total integrity. In listing the individual criteria, and throughout this report, the five judges will be identified as A, B, C, D, and E.

Personal Criteria of Judge A

1. The essential quality of the drawing, or, design for its abstract quality.
2. Sound organization or structure, with elements presented in an interesting way.
3. Sensitivity of the line itself, with recognizability a purely arbitrary characteristic.
4. Careful rendering, plus space filling quality.
5. An individual technique peculiar to the student at his stage of development.
6. Strength of line indicates that the student knows himself with no imposed technique in evidence.

Personal Criteria of Judge B

1. Ease of pictorial structure
   a. The drawing should be designed for the whole space
2. Ideas visualized readily
   a. Ideas presented should not obviously be from second hand sources.
   b. Direct experience results in richer visual conception in a drawing, than vicarious experience.
3. Ease of representation of objects
   a. There should be evidence of individual inventive capacity in the drawing.
   b. Pictorial organization is one of the most difficult things to learn, but is important in the evaluation of a drawing.

Personal Criteria of Judge C

1. Expression should be clear and articulate, with a distinct transmission of ideas.
2. Drawing should show a wise use of the mediums as well as control of technique.
3. Essential elements of the drawing should evidence a departure from general concept, and should seek out the unique aspects of the subject.
4. Subjective presentation should be sincere.
5. Accuracy of perception is important in the drawing process and a clear understanding of natural form provides a strong resource for imaginative pictorial construction.
6. It is important to consider the total integrity of the picture, hence, it is important to develop certain devices to bring about a resolution of the pictorial forces, giving a sense of completeness, even if just by implication.

Personal Criteria of Judge D

1. All elements of a drawing should function.
2. Since the passive or undesirable detracts from the total merit of a drawing, the drawing should have no meaningless or irrelevant material.
3. All elements of the drawing should have clarity of presentation.
4. Recognizability with precision is an important quality, although distortion (as long as the preceding is retained) is the prerogative of the artist.
5. The drawing should present ideas in such a way that there is no groping on the part of the alert observer.
6. Subject matter of a drawing should be presented in a manner which indicates that the subject matter has complete meaning for, or is thoroughly understood by the individual.

Personal Criteria of Judge E

1. Form
   a. Treatment of the drawing as a unit through a sound overall design, balance, and careful placement of objects.
   b. A quality of line which gets the most out of the medium used, and a variety of textures.
   c. Evidence of a correct knowledge and wise use of linear and atmospheric perspective.
2. Concept
   a. An individual concept, and a complete awareness of the concept.
3. Sensibility
   a. A feeling put across by the drawing that indicates a personal experience with, and a personal feeling about the subject portrayed.

Drawing materials used in the investigation included soft black pencils (General Carbo-Weld Exercise, no. 931) and good quality heavy white drawing paper, size 18 × 24 inches. Each student furnished his own drawing board.

B. Procedure in Collecting Data

Descriptions of Three Types of Learning Exercises

Control Group. —In the classroom environment this group was given the action theme, and allowed to draw for 30 to 45 minutes, then the drawings were collected. The three action themes were as follows:

"Fire Engines Going to a Fire"
"Activity in the Lion Cage"
"Active Children in a Country School"

Experimental Group 1. —In the classroom environment this group was given the action theme, shown a sound color film that featured subject matter in varying amounts pertaining to the action theme, then allowed to draw immediately after seeing the film, for 30 to 45 minutes, then the drawings were collected. On theme 1, the film "Fire Engines" was shown. This film has the locale of a big city fire station, shows the routine life of a fireman working around the fire engines. The action of each division of the fire company is portrayed, when the alarm is sounded and they go to the fire. There is quite a strong emotional impact from the nature of the subject matter, and the vivid action portrayed. The running time on this film is 11 minutes. On theme 2 the film "The Zoo" was shown, also an 11 minute film. Although many animals are featured a large part of the film is concerned with lions. While this film does not have as much emotional impact as the previous one, the subject matter is interesting, and has appeal to human nature. On theme 3 the film "Schoolhouse in the Red" there is an emotional effect, due to the strong story concerned with consolidation of rural schools. However, of more immediate use for a drawing on this theme is the part which shows a small one room country school with typical action in and outside the school. The running time on this film is 45 minutes.

Experimental Group 2. —After assembling at a prearranged starting point the students were taken by cars to the particular field trip destination. Upon arriving at the field trip destination the students were given the action theme that they would interpret in a drawing. Each field trip situation was different, as explained in a brief discussion of each that follows, but in each field situation students were allowed to draw from 30 to 45 minutes in that environment, and the drawings collected. The field trip concerned with theme 1 was to the Main Fire Station, Madison, Wisconsin. A captain in the fire department met the group, and led a conducted tour, lasting about 30 minutes, through the fire station. Verbal descriptions, and actual demonstrations were included, with opportunity for questions by the students. The students were then allowed free run of the station to select whatever subject matter they wished to include in the drawings. The field trip concerned with theme 2 was to the lion house of the Vilas Park Zoo, Madison, Wisconsin. A zoo attendant was present to point out characteristics and eating habits of the lions, and to answer any questions. The field trip was held at a time when the lions were inclined to be more active, and moving around. The students could use whatever sensory material they found in that field trip situation, in their drawings. The field trip concerned with theme 3 was taken to the Catfish Rural School, Dane County, Wisconsin. This is a large one-room rural school located about six miles north of Madison, just off highway 113. Students were taken to this school while the school was in session, allowed to observe, and make drawings there while the school activities were going on. Part of the school room activity included organized classwork, part of it included recess, where some of the pupils chose to watch the drawings being made. The school teacher was available for questions, and the students talked freely with her. Again, the students were free to use whatever sensory materials they wished, in their drawings.

General Instructions to All Students Making Drawings

Since three classes were used, the general instructions had to be given three times, in each of three classroom situations. After the investigator had been introduced, the title and purpose of the investigation were given. The setup of three parallel groups was explained, along with explanation and example of the type of thing done in each group. That assignment to groups would be done on a random, impartial basis was brought out, besides the fact that once assigned, a person would make three drawings in that same group. The three statements that were to serve as criteria for the drawings were presented, with opportunity for questions on any part of the explanation. The fact that the drawings would be put together for the evaluation was pointed out, and that the evaluation jury consisted of five college art teachers, each using his own criteria in the process. The students were informed that they would not be graded on this, except as their work counted toward daily class work. The students were informed as to the type of materials that would be used, that except for supplying their own drawing boards, all materials would be furnished. An attempt was made to keep all explanations to all three classes as uniform as possible; however, the above information was regarded as essential, so none was omitted.

Evaluation of Drawings

After all the drawings had been collected they were put into three groups according to the action theme, making 60 drawings each on three themes. Since the students' names were on the back, an identifying three digit number was the only identifying mark on the front side. This number was placed in the upper right hand corner, in black india ink, with the number 3/4 inches high. Since these numbers were not assigned in any logical sequence to represent groups, when displayed they ran clockwise around the room, from the smallest

to the largest number.

For the first evaluation, three sets of 60 drawings were hung in two rows, at near eye level in three unused classrooms, one large, and two smaller rooms. Prior to hanging the drawings, all windows had been covered with brown paper (to admit no light, since evaluation was done in the daylight hours) and the electric light was equally strong on all drawings. Each judge worked independently, with the help of the investigator to mark his choices as they were made. One complete theme was judged at a time, with one evaluation sheet for each of the three action themes.

Reference is made here to the sample evaluation sheet, or scoring sheet, in the appendix,* and included here. This evaluation sheet has spaces in which numbers of individual drawings are to be placed. On the left hand side of the sheet there are four blocks of spaces, each including spaces for 15 numbers. The caption under each block is self-explanatory, but by filling every space the number of every drawing of the total 60 will be there. The spaces on the right hand side are for the ten best drawings in the upper right, and the ten poorest drawings in the lower right. The criteria that the students had when the drawings were made were printed on this sheet for the convenience of the judges. There was no specified order in which this evaluation sheet was to be filled out. However, the most common procedure was as follows: (All drawings were in plain view at all times.) 1) The best 15 drawings were selected, the numbers marked down in the 'first quartile' block, and a small colored identification tag placed in the corner of the 15 selected drawings. 2) From the 15 marked drawings, the two best drawings were selected, the numbers put in the two spaces in the upper right. 3) From the remaining 13 marked drawings the 8 best were selected, numbers marked in the block of 8 spaces in the upper right. 4) To the other extreme, the 15 poorest drawings of the entire 60 were selected, numbers marked in the spaces of the 'fourth quartile', and these 15 drawings marked with a different colored tag, for identification. 5) From the 15 drawings marked by the 2nd color, the two poorest drawings were selected, numbers marked in the spaces for the two poorest in the lower right. 6) From the remaining 13 drawings in this group the 8 poorest were selected, numbers put in the block of 8 spaces in the lower right. 7) From the remaining 30 unmarked drawings, the 15 best were selected, and the numbers marked down in the 'second quartile' block of 15 spaces. 8) Since all 60 are to be represented on this sheet, the investigator was able to fill in the 15 spaces remaining, in the 'third quartile' block. After one complete action theme had been judged, all colored tags were removed, before the next judge began his evaluation. After all five judges had evaluated the three action themes of 60 drawings each, the drawings were taken down.

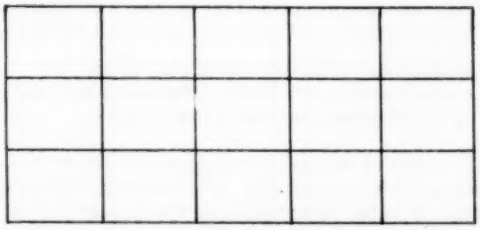
At the time of the first evaluation of all drawings (180) the judges knew that they would be asked to make another evaluation of one complete action theme (60 drawings) after a two month time lapse, but the judges did not know which of the three action themes would be the one selected for reevaluation. By a system of random selection, theme 1 ("Fire Engines Going to a Fire") was the one selected for the second evaluation. Before these drawings were hung for the second evaluation the numbers were changed to two digit numbers, 3/4 inches and located in the upper right corner. The reason for changing the numbers was that if visual memory persisted from one evaluation to the next, it would be of the drawings themselves, and not in the way they were identified by number.

For the second evaluation, two months after the first evaluation was made, the drawings were displayed in the same large classroom that had been used previously. The same precautions were taken here to insure adequate even lighting on all drawings, as had been taken in the first evaluation, and the drawings were hung at near eye level, in two rows. Since the numbers assigned in this second instance had been done with no logical sequence to represent groups, when displayed, they ran clockwise around the room, from the smallest to the largest number. Judges worked independently as before, with the investigator present to put tags on the drawings as they were selected. The same score sheet, or evaluation sheet, was used here, as in the first evaluation, with same procedure of selection that has been described. After each judge finished his evaluation of the 60 drawings on this action theme, the identification tags were removed, to eliminate the possibility of one person's judgments influencing another's judgment. With this phase of the evaluation finished, each of the five judges had evaluated themes 1, 2, and 3 in the first evaluation, and theme 1 two months later in the second evaluation.

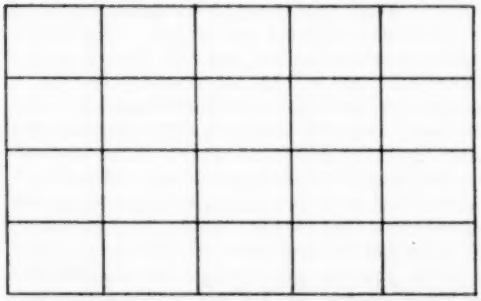
At this point in the procedure the evaluation data consisted of twenty evaluation sheets, each containing eighty filled spaces. For convenience in handling, the drawings were renumbered 1 through 60, and former numbers transposed to twenty new evaluation sheets, where numbers 1 through 20 were drawings made by the Control Group; 21 through 40 the Experimental Group 1; and 41 through 60 the Experimental Group 2.

* All references to Appendices may be found in original thesis on file in Library, University of Wisconsin, Madison, Wisconsin.

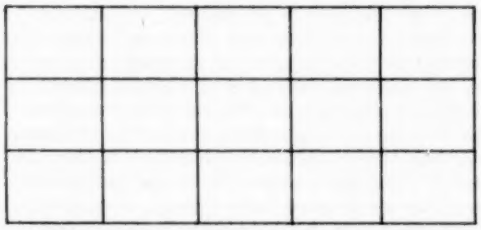
Evaluation of Drawings



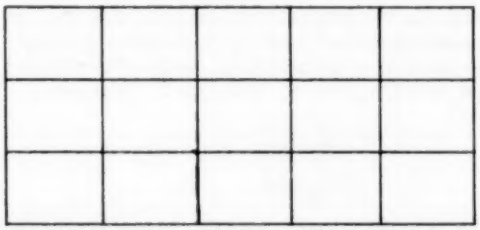
First Quartile - The Best Fifteen Drawings
(No particular order in this group)



Second Quartile - 2nd Best Fifteen Drawings

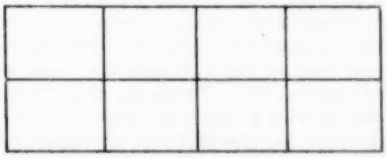


Third Quartile - 3rd Best Fifteen Drawings



Fourth Quartile - 4th Best Fifteen Drawings

From 1st Quartile, The Two Best



From Remaining 13 of the 1st Quartile
Select the Eight Best Drawings
(No particular order in this group)

The following questions were presented as criteria to act as directional guides for individual drawings:

1. Are the forms clearly presented?
2. Does the drawing convey a message?
3. Do all parts function to give unity to the drawing?

From 4th Quartile, The Two Poorest

From Remaining 13 of the 4th Quartile
Select the eight Poorest Drawings.

With a total of 60 drawings on each action theme, division of the 60 into quartiles gives an even 15 in each quartile. With the evaluation sheet used, it may be obvious that the numbers arrange themselves from one extreme to the other as follows: 2, 8, 20, 20, 8, 2, which total 60, but follow the normal probability curve. Since the score sheet, or evaluation sheet is set up on this basis, it is a simple matter to assign scores 1 through 6 on the basis of these 6 levels. According to this plan, only two scores out of the 60 can have the value of 6, the highest score; only two scores can have the value of 1, the lowest score, etc. From the twenty evaluation sheets which numbered the drawings from 1 through 60, the table of raw data was compiled as a summary of all evaluations made by the judges. It may be pointed out here that the 2, 8, 20, 20, 8, 2 correspond roughly to the following percents that go to make up the normal probability curve, 4, 13, 33, 33, 13, 4, totalling 100%. Although there are six resulting levels, these are in no way meant to represent grades, but merely levels of performance. When a jury has to select 20 paintings to hang in a given space from 100 submitted, the process is simply one of selection of the best 20, for example. In a parallel situation, when a judge has to select the 15 best drawings from the total number of 60, it eliminates the other 45 from consideration at that stage.

C. Treatment of Data

Controls were employed in the investigation as follows:

1. Each person in these three drawing classes had the same chance for random assignment to each of the three groups.
2. Regardless of group each person had the same three action themes.
3. Regardless of group each person had the same time limit on drawings.
4. Regardless of group, each person used the same materials, black drawing pencil, and white drawing paper.
5. Regardless of group, each person had the same general instructions and explanation.
6. Since each of the three classes were divided three ways, the differences between classes was minimized.
7. Regardless of group, each person had the same three criteria for the drawings.
8. The same five judges made evaluations on the drawings of all the students in the investigation.
9. The information requested on the individual questionnaire and data was the same for all.
10. Regardless of group, each person had to make drawings on three different days, and time allotment was the same for all.

The process of evaluation assigns a level of achievement to each drawing, on every action theme. As discussed in the description of the procedure in Part B, just preceding this part, the numbers of specific drawings were transposed into numbers on the scale 1 through 6, with 6 being the high end of the scale. The resulting table of raw data was used for the basis of all statistical computation by which comparisons and contrasts are shown. This table of raw data is located in the appendix (found in the original thesis), and will be referred to often in the discussion of how the data was treated.

At an early stage the analysis of variance technique was employed using the means of the three groups on each of three action themes. In table form, three means can be averaged on each group, and a grand mean calculated. Using the formula found on page 336 of Alexander M. Mood's Introduction to the Theory of Statistics, the analysis of variance problem was worked out. This formula is given on the next page.

The question to be answered in this process was, "Does the among variance exceed the within variance by an amount that is statistically significant?"

At another stage, "Students T" scores were calculated to test the significance of differences between the mean achievement of various groups under different conditions. "Students T" scores were worked out for the second evaluation of theme 1, in addition to the regular evaluations of themes 1, 2, and 3. To determine what the probabilities that the differences were large enough to have occured by chance, the table on distribution of the "Students T" was consulted. By this method, the level of probability for each score was determined.

As a check on the calculations concerned with the "Students T" critical ratios were calculated on the second evaluation of theme 1, besides the regular evaluations of themes 1, 2, and 3. The formula used in calculation of "Students T" was as follows:

$$\frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2 + S_2^2}{N - 1}}}$$

The formula used in the calculation of the critical ratios was as follows:

$$\frac{\text{Diff. (means)}}{\sigma \text{ Diff.}}$$

Source	Sum of Squares	Degrees of Freedom	Mean Square	"F" Test
Row	$mc\sum_{i}(\bar{x}_i - \bar{x})^2 = S_1$	$r - 1$	$\frac{S_1}{r-1} = S_1$	$\frac{S_1}{S_4}$
Column	$mr\sum_{j}(\bar{x}_j - \bar{x})^2 = S_2$	$c - 1$	$\frac{S_2}{c-1} = S_2$	$\frac{S_2}{S_4}$
Interaction	$m\sum_{ij}(\bar{x}_{ij} - \bar{x}_i - \bar{x}_j + \bar{x})^2 = S_3$	$(r-1)(c-1)$	$\frac{S_3}{(r-1)(c-1)} = S_3$	$\frac{S_3}{S_4}$
Deviations	$\sum_{ijk}(x_{ijk} - \bar{x}_{ij})^2 = S_4$	$rc(m-1)$	$\frac{S}{rc(m-1)} = S_4$	
Total	$\sum_{ijk}(x_{ijk} - \bar{x})^2$	$rcm - 1$		

k = groups, m= cases, i = individuals, j = columns

The level of probability of critical ratios was determined, as had been done for the "Students T" score.

A further check on the differences in achievement of the three different groups was made by calculation of critical ratios, using the same formula for critical ratio as shown above. The level of probability for these critical ratios was determined. As a method of checking this work, "Students T" scores were calculated by the use of the same formula for "Students T" as shown above.

The extent of agreement of judges was studied by calculation of the coefficient of correlation of every judge with every other judge on each of three action themes in the regular evaluation. As a result of this process, 30 coefficients of correlation were calculated. This also made possible the calculation of a median coefficient of correlation for all judges on each of three action themes.

The extent of reliability of evaluation was determined by two methods: the first established the extent of agreement between two judgments of one person, as expressed in a coefficient of correlation for each of three groups. The formula used in the calculation of these coefficients of correlation was as follows:

$$r = \frac{xy - (\Sigma x \cdot \bar{y})}{\sqrt{(x^2 - \Sigma x \cdot \bar{x})(y^2 - \Sigma y \cdot \bar{y})}}$$

In the first instance five coefficients of correlation resulted, one for each judge. In the second instance, three coefficients of correlation resulted, one for each group, X, Y, and Z. All coefficients of correlation were calculated on the first and second evaluations of action theme 1.

If the reliability of an investigation such as this were to be based primarily on the agreement of one person's first and second judgments, this method is proposed as one which would increase the extent of reliability: Evaluations of the three judges having the highest coefficient of correlation between their two evaluations were averaged, then by the use of the same formula as that used above, the coefficient of correlation was calculated between the highest and the lowest group of judges. (The lowest group in this case would consist of two judges, whose two evaluations could also be averaged.) The resulting coefficient of correlation between the two groups would indicate whether the results would have been significantly different if only three, instead of five, judges would have been consulted.

How the accumulated data has been treated has been indicated. The findings from the treatment of this data will be listed in Part A of Section III; Part B of Section III will describe the group, according to the results of the individual data sheet and questionnaire; Part C of Section III will compare group accomplishment, and through the discussion will interpret the findings to the end that the findings support the inferences made, and lead to the conclusions of the investigation.

SECTION III

STATISTICAL ANALYSIS OF FINDINGS

A. Statistical Findings

THE RAW data gathered from sources indicated in Part A of Section II, and treated as described in Part C of Section II will be presented in this section under the following headings: 1) Analysis of Variance, 2) Variance Between

Groups, 3) Group Accomplishment by "Students T" and Critical Ratio, 4) Agreement of Judges, 5) Agreement Between 'Most Reliable' and 'Least Reliable' Judges, 6) Reliability of Performance by Judges, and 7) Reliability of Performance by Groups. In some instances the analysis has resulted in the findings presented here; in some instances additional comment is included in this section, and in Part C of this section to further analyze and interpret the findings.

1. Analysis of Variance:

Source	Sum of Squares	Degrees of Freedom	Mean Square	"F Test"
Row*	4.84	2	2.420	4.21***
Column**	.00	2	.00	.00
Interaction	2.044	4	.511	.890
Deviation	98.21	171	.574	.....
Total	105.054	179	.....	.....

* This represents the three different groups: Control, Experimental 1, and Experimental 2.
** This represents the three action themes, 1, 2, and 3.
***In the "F Test" this amount is significant at the .05 level.

2. Variance Between Groups:

	Critical Ratio	"Students T"
X to Y (Control to Experimental 1)	1.76	1.76
X to Z (Control to Experimental 2)	1.27	1.28
Y to Z (Experimental 1 to Experimental 2)	2.84*	2.84

*Significant at the .01 level.

3. Comparison of Group Accomplishment:

	Comparison	"Students T"	Critical Ratio	Direction
Action Theme 1	X to Y	.567	.567	X
	X to Z	.088	.088	Z
	Y to Z	.702	.702	Z
Action Theme 1a	X to Y	.707	.707	X
	X to Z	.758	.760	Z
	Y to Z	1.439	1.444	Z
Action Theme 2	X to Y	.981	.981	X
	X to Z	2.115*	2.105	Z
	Y to Z	2.911**	2.911	Z
Action Theme 3	X to Y	1.509	1.500	X
	X to Z	.078	.077	Z
	Y to Z	1.317	1.317	Z

* Significant at the .05 level.
**Significant at the .01 level.

4. Agreement of Judges:

Judges agree to the extent shown by the following coefficients of correlation, on evaluation of all 60 drawings of the three action themes:

Judge	Theme 1	Theme 2	Theme 3
AB	.24	.52	.15
AC	.32	.48	.32
AD	.48	.30	.58
AE	.11	.31	.54
BC	.44	.59	.66
BD	.42	.18	.42
BE	.17	.30	.35
CD	.42	.28	.46
CE	.17	.39	.34
DE	.27	.15	.65

Median scores for the three themes are as follows:

Theme 1	.295 (Interpolated)
Theme 2	.305 (Interpolated)
Theme 3	. 44 (Interpolated)

5. Agreement Between 'Most Reliable' and 'Least Reliable' Judges:

On the basis of each judge's coefficient of correlation between his two evaluations (shown in part 6 immediately following), the five judges were assigned to two groups: Most reliable, the ones with the three highest coefficients of correlation between their own two evaluations of action theme 1, and Least reliable, the two with the lowest coefficients of correlation. The evaluations are averaged for each group, and the coefficient of correlation between groups calculated using the same formula as before. Group ACD to BE gave a coefficient of . 46.

6. Reliability of Performance by Judges:

On two evaluations of one complete action theme (60 drawings), with a two months time lapse between evaluations made by the same judge, the following coefficients of correlation were calculated:

Judge A	.72
Judge B	.56
Judge C	.83
Judge D	.80
Judge E	.37

7. Reliability of Performance by Groups:

On one complete action theme (60 drawings) that was evaluated twice, with a two months time lapse, the ratings of five judges were averaged and the coefficients of correlation were calculated for the three groups X, Y, and Z.

X to X' (Control Group)	.76
Y to Y' (Experimental Group 1)	.90
Z to Z' (Experimental Group 2)	.91

B. Summary of Individual Data Sheet and Questionnaire

Reference is made here to the sample individual data sheet and questionnaire in the Appendix and found on page 79 of this study. The purpose of this data sheet was to supply important information on each student relative to this background, training, experience, and co-curricular activities; to provide information about the extent of contact with subject matter of the action themes used in this investigation; and to allow each student the opportunity to express his opinion about the outcomes of this study, and to indicate his interests in particular aspects of the material used.

Since these data sheets were filled out in the classroom after all drawings had been completed, the students were in a position to express themselves. Students were encouraged to add any additional comment that they wished, which many chose to do. There was 100% return on these data sheets, so that a complete account is available.

The summary of all compiled information is shown in table form on the following pages, the total information is listed in the first column, with the breakdown according to the three groups that featured different art experiences.

With opportunity to describe one's own style of drawing, the most common descriptive terms include such things as: 'none developed yet,' sketchy, exact, loose, detailed, childish, indescribable, cartoon, coarse lines, 'don't know,'

SUMMARY TABLE

		Total	Control	Experimental 1	Experimental 2
Classification	Freshmen	35	10	16	9
	Sophomores	14	4	4	6
	Juniors	7	4	0	3
	Seniors	4	2	0	2
Home Address	Madison, Wisconsin	15	7	4	4
	Within Wisconsin	29	6	12	11
	Out of State	16	7	4	5
Subject Area	Applied Art	16	8	5	3
	Art Education	12	1	7	4
	Other Subject Areas	32	11	8	13
Number of College Art Courses	1	29	10	8	11
	2	9	5	1	3
	3	13	3	7	3
	4	7	2	2	3
	5	2	0	2	0
Semesters of High School Art	0	23	5	6	12
	1	2	0	1	1
	2	12	4	6	2
	3	5	0	1	4
	4	7	4	3	0
	5	0	0	0	0
	6	4	3	1	0
	7	1	1	0	0
	8	4	3	1	0
	12	2	0	1	1
Number Having Private Art Instruction	1 year or less	2	1	1	0
	1 - 2 years	8	4	3	1
	Over 2 years	1	0	1	0
Number of Visits to Fire Station Since Starting High School	0	13	5	4	4
	1	11	1	2	8
	2	8	4	2	2
	3	2	0	0	2
	5	1	0	1	0
	10	2	0	1	1
	500	1	1	0	0
Number Who Have Never Visited a Fire Station		22	9	10	3
Number of Visits to Lion House of a Zoo Since Starting High School	0	5	3	1	1
	1	10	5	3	2
	2	12	3	4	5
	3	9	2	4	3
	4	4	1	1	2
	5	2	2	0	0
	6	2	0	0	2
	7	0	0	0	0

		Total	Control	Experimental 1	Experimental 2
	8	0	0	0	0
	10	4	2	2	0
	12	1	0	0	1
	40	1	0	1	0
	200	1	0	0	1
Number Who Have Never Visited the Lion House at a Zoo		9	2	4	3
Number of Persons Who have Attended a Country School		9	2	3	4
Years Attended in a Country School	1/2	1	1	0	0
	2	2	1	1	0
	5	1	0	0	1
	6	2	0	1	1
	8	3	0	1	2
Opinion of 45 Minutes as a Time Limit?	Not adequate	12	3	5	4
	O. K. for Sketch	5	4	0	1
	Plenty of Time	42	12	15	15
	No Opinion	1	1	0	0
Group Preferred if Study were Repeated?	Control Group	11	6	2	3
	Experimental Group 1	8	3	3	2
	Experimental Group 2	41	11	15	15
Which Group Do You Think Excelled	Control Group	7	3	2	2
	Experimental Group 1	9	3	3	3
	Experimental Group 2	43	13	15	15
	No opinion	1	1	0	0
Reasons Given for Specific Group Preferred?					
A. Control Group					
Better to work from imagination		4	1	1	2
Favors thinking out art organization		1	0	0	1
Better for use of originality		1	1	0	0
Better for creativeness		1	1	0	0
More freedom in drawing		1	1	0	0
Enjoys using imagination here		1	1	0	0
Favors individual interpretation		1	0	1	0
Easier, not so much to do		1	1	0	0
B. Experimental Group 1					
Presents most ideas, novel ways		2	1	1	0
Time saving, no running around		1	0	0	1
Experimentation, compare results		1	0	0	1
Easy way to get ideas		1	0	1	0
Interesting, permits use of imagination		1	1	0	0
Movies are entertaining		1	0	1	0

	Total	Control	Experimental 1	Experimental 2
C. Experimental Group 2				
More interesting from real life	12	2	1	9
Something definite to look at	8	3	4	1
Gives needed information here	10	1	8	1
Easier to draw from actual object	4	0	2	2
No need to rely on memory	3	3	0	0
Get around more to new locations	1	0	0	1
Practice valuable on the spot	1	0	0	1
Get better action here	1	1	0	0
Get more feeling here	1	1	0	0
No opinion	1	1	0	0
On Which Theme 1 (Fire Engines)	13	3	4	6
Do You Think 2 (Lion)	18	5	6	7
You Made the 3 (School)	28	11	10	7
Best Drawing? No Opinion	1	1	0	0
Reasons Why You Think that (Above) Drawing is Best?				
More interested	14	4	1	9
No reason	9	5	3	1
Like action theme	8	3	3	2
More acquainted	8	3	5	0
Easier to draw	7	0	3	4
More unity, organization	3	1	2	0
Flexible, free	3	0	2	1
More action	2	0	0	2
More humor	1	1	0	0
More use of imagination	1	1	0	0
More value and pattern	1	1	0	0
Less complex	1	1	0	0
More relaxation	1	0	1	0
Fulfilled assignment	1	0	0	1

or 'enjoy expression.' Many students responded to this item in a manner that indicated that they expected this art course and others to help them 'develop' a style in the course of their education. Reference to the results obtained through the use of the individual data sheet will also be referred to in Part C that follows, in the analysis of group accomplishment.

C. Analysis of Group Accomplishment

Where group accomplishment was compared on each of the three action themes, plus the second evaluation of theme 1, the accomplishment of Experimental Group 2 (Z group, or the Field Trip group) was greater in every instance when compared with the other two groups. When compared with the control group (X group, or Creating on a theme with no provided sensory material) the Z group had the advantage in all four comparisons, but in no instance was the amount great enough to be statistically significant. When compared with Experimental Group 1 (sound-color movie group, Y group) the Z group had the advantage in all four comparisons, but only on theme 2 was the amount statistically significant, on the .01 level. When groups X and Y were compared, group X had the advantage in all four comparisons, but only on theme 2 was the amount statistically significant, on the .05 level.

When the reliability of performance by groups was checked on 60 drawings of theme 1, which was judged twice by five judges, there were slight differences in the stability of groups, Z group

Individual Data Sheet and Questionnaire

Name_____ Classification Fr.___ Soph.___ Jr.___ Sr.___

Home Address_____ Major Subject Area_____

Please fill out this data sheet and questionnaire, answering every item to the best of your ability. The investigator had no official relationship to any teacher who participated in this study. When completed, hand this in to your instructor.

Write names and course numbers of all art courses you have had on the college level:

_____ _____ _____

How many semesters of art instruction did you have in high school?_____

Have you had any private art instruction? (check one) Yes____ No____
If yes, (above) explain:_____

Listed here are the three action themes used in this experiment:
____"Activity in the Lion Cage."
____"Fire Engines Going to a Fire."
____"Active Children in a Country School."

1. Check the theme on which you think you made the best drawing (above).

   Why? (above)_____

2. Have you ever visited the lion house or zoo? Yes____ No____

   Approximately how many times since you started high school?_____

3. Have you ever visited a fire station? Yes____ No____

   Approximately how many times since you started high school?_____

4. Have you ever attended a country school? Yes____ No____

   If yes, for how many years?_____

Listed here are the three groups used in the experiment:
____a. "Control Group" (Drew on the theme only)
____b. "Experimental Group 1" (Drew after sound color film)
____c. "Experimental Group 2" (Drew while on a field trip)

5. Check the group in which you did your drawing (above).

6. What do you think of 45 minutes as a time limit?_____

7. Which group would you prefer if the study were repeated? a.____ b.____ c.____

   Why? (above)_____

8. As a group, which group will do best in final evaluation? a.____ b.____ c.____

9. How would you describe your particular "style" or manner of drawing?_____

   _____

having .01 higher reliability coefficient than Y group, and .15 higher than X group. While the difference between Y and Z is negligible, the indication toward instability by X group may be because the positive qualities such as originality, creativeness, spontaneity, and freedom of expression believed by many to accompany the type of art experience to which group X had exposure, appear to 'scatter' that group in a situation where comparative evaluation is used.

On the two evaluations of theme 1, it is interesting to note that when groups X and Y are compared, group X gained .30 over group Y by the second evaluation. Group Z gained .67 over X, and the greatest gain was made by group Z over group Y, .91. Some drawings have qualities that 'wear well' while others may have appeal that is fleeting. Perhaps the art experience has a contribution to make in determining the 'lasting' qualities of a drawing created in that environment.

If recent experience with the subject matter of the action themes were important (the effect of this experience on drawings by individuals) apparent advantage for groups would be as follows: As reported by the individual data sheet Z group has had slightly more experience with the subject matter of theme 1, and groups X and Y about the same. With the subject matter of theme 2, group X seems to have had slightly more experience, with groups Y and Z about the same. With the subject matter of theme 3, group Z seems to have quite a definite advantage, since the group as a whole has had a total of 27 years of attendance at a country school; group Y has had 16 years; and group X seems at a disadvantage with only 2-1/2 years in all.

Since the "Student T" scores and the critical ratios that were calculated showed Z group to be superior in every instance where compared to groups X and Y, one might expect that chance assignment had thrown more people into that group who had superior educational training and background. However, the opposite seems to be true, according to the information supplied by the individual data sheets. In the number of art courses had in college, groups X and Z are about the same with group X having a slight advantage. Group X and Z have fewer people who are enrolled in an art curriculum, so Y group may appear to have an advantage here. While groups X and Y have 5 people who have had private art instruction, group Z had only 1. With only 27 semesters of high school art had by group Z, group Y had almost two times as much, and group X almost three times as much as that had by group Z.

In summary, analyses of the findings show that there is a substantial difference in performance by groups. Where groups are compared Z group is superior in every instance to X and Y. Where X and Y are compared X is superior in every instance. Differences in performance are statistically significant in some instances at the .01 level, in some at the .05 level, and in some instances are not large enough to be statistically significant.

In the process of evaluation, the findings show that the agreement of judges, as shown by coefficients of correlation range from .11 to .66, but that some judges agree to a greater extent than others. As shown by two judgments of the same material, with a two month time lapse, coefficients of correlation range from .37 to .80. This would indicate that some judges are more reliable than others, and also that judges agree 'with themselves' more than they agree with each other.

No attempt was made in this investigation to equate the three groups on the basis of curricular or co-curricular training and experience, or past experience with subject matter of the three action themes. However, findings from the individual data sheet and questionnaire show a wide difference with individuals in the above areas. Information supplied through this avenue is valuable in the extension and application of the findings of this investigation.

Through an analysis of the drawings themselves, many of the things brought out in the analysis of the findings will be graphically illustrated. For that reason, a catalog of 36 selected drawings, with the written discussion included, will be presented in Section IV.

SECTION IV

COMPARATIVE STUDY OF INDIVIDUAL DRAWINGS

A. Discussion of Drawing Qualities

FROM THE 180 drawings that were made on three action themes, 31 have been chosen for special analysis. The first group chosen for consideration includes the three best drawings on each of the three action themes, as determined by the evaluation jury of five college art teachers. If terms taken from the criteria offered by the five judges themselves may be used to describe these drawings, they may be said to have such qualities as: clear and articulate expression, individual technique, interesting presentation of elements, space filling quality, sound organization, careful rendering, sincere subjective presentation, and ideas expressed readily. If the terms used by the students in describing the best drawings may be used, they may be expressed as: more interesting, more creative, and to possess more action, more unity and organization, more flexibility, more value and pattern, and more use of imagination. Of course, regardless of the terms chosen to describe a set of drawings, not

every drawing will be found to be equally strong in every quality listed.

An examination of the numbers represented in the nine best drawings will reveal that seven are products of the Z group, one of the X group, and one of the Y group. It may be noted that student 482 of Z group had drawings good enough to be rated in the top two out of 60 drawings on all three action themes. On theme 1, 2, and 3, student 482 received ratings of 5, 5, 5, 5, 6; 4, 6, 6, 4, 5; and 4, 5, 6, 5, 3, respectively. (A rating of 6 means one out of the two best in 60 drawings; 5 means within the next eight best of 60 drawings, etc.)

One important advantage which the field trip would appear to have is illustrated by 482 on theme 1. The student who made this drawing positioned himself to the left rear of the large hook and ladder truck in the fire station. With much of the sensory material there for reference, he built an interesting composition on the assigned action theme. Quite a contrast in draftsmanship is evident in comparing 126 and 458 on the first action theme. However, where many qualities go to make up a good drawing, 126 apparently is judged superior on such qualities as sincerety of presentation, total organization, or more adequate handling of the action theme. The novel viewpoint in 458 apparently has much to do with the success of the drawing, also, since originality and creativeness are important. In 928 the subject matter includes much detailed drawing which requires intense observation by the person in the field trip situation; however, the detail is not allowed to become all important. In 745, in the drawing of the two lions, such things as simplicity and directness of expression apparently compensate, to some extent, for the lack of a more detailed knowledge of the form, and a more sensitive line. In 304, the schoolroom scene, there is a good illustration of how certain elements are stressed, and others played down, to achieve a total satisfying effect. One device used to direct attention to the form of the teacher, silhouetted in an action pose, is the convergence of lines toward that point.

The nine drawings found to be poorest include six from group Y, two from group X, and one from group Z. Seven of the nine drawings judged to be poorest are shown here. If the negative terms from the criteria of the five judges may be used, the three poorest drawings on each of three themes may be described as poor in construction and organization, ideas often obviously from second-hand sources, little evidence of individual inventive capacity, insincere in presentation, including irrelevant and meaningless material, poor in balance, and lacking the variation in line and texture to make an interesting drawing. If we may describe the nine poorest drawings in terms used by the students in the individual data sheet, we might say that these drawings were lacking in information, showed little imagination or originality, lacking in interest, uncertain and sketchy, and not enough life.

From an examination of the numbers in this group, it will be noted that 736 appears in the poorest two on all of the three themes where 60 drawings were evaluated. On themes 1, 2, and 3 in order, 736 rated as follows: 3, 1, 3, 1, 3, and 1, 1, 1, 3, 3, and 2, 1, 1, 2, 3.

In 217 on theme 1, a novel idea had little effect, because of apparent weaknesses such as poor organization, scattered elements, and lack of emphasis. In 439 one defect of the control group may be illustrated where space is filled with broad lines that add little to the interest, and in the 'almost human' face which may have been because certain information was lacking. In 726 a serious defect of the Z group appears to be the unthinking attempt to render sensory information with no attempt to organize or unify the elements into good composition. The poor showing made by two drawings on the second theme, numbers 738 and 783 shown later, indicate that perhaps some allowance should be made in setting up the framework for evaluation so that a 'too obvious' sense of humor would not be penalized when considered in with 59 other drawings.

Some advantages and disadvantages of the X, Y, and Z groups have been indicated as possibilities. It was thought desirable to include a section where the most obvious advantage and disadvantage of each group could be most clearly illustrated.

The advantages of originality, freedom of expression, unique imaginative quality, and creativity are claimed for the unhampered art experience. It may be, as in 485 on theme 3, that when a person who has ease and facility of expression, along with a large stock of memory images, is allowed to concentrate on the drawing in a situation where no great amount of sensory data is present, a well organized drawing is more likely to be forthcoming. On the other hand, lack of needed information can often prevent the elements of a drawing from fulfilling their function, as in 875 on theme 3. Poor use of space is evident in 875, possibly because the needed information was not at hand. In 695 on theme 2, ideas which apparently had their origin in the movie which was seen just before the drawing was made, are worked into the drawing in such a way that it becomes a unified whole. In 624 on theme 2, material which also seemed to come from the movie still appears to be extraneous, and the design disorganized. Much research needs to be done to demonstrate the impact of moving pictures on our experience, and just how permanent this impact is, in the way we assimilate the information. In 459 on theme 3, there are many elements in the drawing which appear to be well drawn and generally correct. The clock looks like a clock,

the globe like a globe, etc. Even though there are such defects as perspective, and proportion difficulties, the elements are well placed and appear to function. In 745 on theme 3, an apparent defect is excessive concern with putting things down just as they are, with little thought going into the process of making an interesting drawing. Stiff, formal drawings often result from just putting down items at random in a drawing.

There are many qualities of drawings that influence any attempt to evaluate drawings. Some qualities are more or less characteristic of the stage of development at which these students are now. Drawings 126 and 413 were selected as illustrative of the naive, frank, primitive concept of subject matter. Much of the value of this quality comes because the drawing has unaffected and childlike treatment of the subject matter in a way that ignores rules and principles of drawing, and includes only that essential to the composition. These two drawings were selected from the three sets of 60 drawings on the different themes, and they both happen to have been made by X group; however, qualities such as these mentioned above are often claimed for the art experience which has unhampered expression. Number 413 has interesting placement of objects, and space arrangement, however, the thing of special interest here is the drawing of various parts of the picture as though each were a unique, separate picture, viewed from a different angle. Intensity of expression sometimes results in crude work, although the process of weeding out the irrelevant results in a simplicity that is an asset to the drawing, and not a detriment.

Althcugh drawings with perspective problems would be many in a group of students in a basic drawing course, drawing number 138 on the first theme is an example of perspective difficulties that complicate drawing at this stage. Any person who has tried to draw several buildings at different levels in one drawing, as in 138, can appreciate the complexity of the problem. The picture plane or ground plane of an object has to be visualized in order to make a convincing drawing. Since drawings such as these are made on flat surfaces, there are only two dimensions, and yet objects which the observer knows to be solid must be made to look solid.

As has been suggested, several drawings included a cartoon quality, which had varying degrees of success. Where humor is employed, a person has to handle it with care, or the attempt may be too obvious. In the cartoon the subject is often dealt with by caricature or by allegorical symbols. The difficulty a person often runs into, in using cartoon technique, as in drawings 738 and 783 on theme two, is that a person often accepts hackneyed or stereotyped devices worked out by others, and reaches a 'plane' of development at which he is arrested. In the use of symbols or cliches there is too great an emphasis upon standard forms.

The story telling quality is present to some extent in every drawing. However, group experience similar to that undergone by group X in this investigation seems to provoke more than other types of experience where there is a greater amount of sensory material in the immediate environment at the time of the creation of the drawing. In 204 the title was thought to be necessary, and perhaps it is needed. However, the inexperienced artist is often tempted to put labels on his drawings, to express more completely what he feels incapable of saying through the medium of drawing. 'Activity' is certainly the keynote of the drawing 217, theme 2. This drawing was one where judges tended to differ widely, while others of the more representational character were more stable.

The realistic, or illustrational quality, in which the observer feels the actuality of the situation pictured in the drawing was used in many drawings. Numbers 756 and 615 both seem to achieve a truthful presentation, yet while the drawing is very fine in 615, the total organization is ignored, while in 756, that is considered. Details are made plain in both of these drawings in a practical way by emphasis and subordination at appropriate places. This representational quality is more than mere photographic likeness; a camera is too literal; here there must be a process of assimilation of detail, reorganization and interpretation, and presentation of new and more vivid relationships.

In summary, because the symbols of expression used in graphic illustration are quite different than those commonly used in verbal expression the inclusion of drawings and the written analysis is felt to be essential in order that the reader may get a well rounded view of important qualities evident only when the drawings themselves may be seen. While we may get agreement on some things thought to be essential to a good drawing, terms may often be misleading, or have different meanings to different people. Where verbal descriptions are used, descriptions must be tightly drawn to reduce the danger of double meaning or ambiguity.

Since this investigation does identify a 'best' group of drawings, and a 'poorest' group, it would be an interesting extension of this study to submit all the drawings in these two groups to various art juries, as well as to lay juries for evaluation and classification into the two groups. High ranking drawings do not possess qualities thought to be necessary for a 'good' drawing, in equal amount. Apparently, special strength in a certain positive quality compensates to some extent, for lack of strength in another positive quality.

Often an artist will describe his style of draw-

ing as having a cartoon quality, or an illustrational quality, or some other descriptive term that, to him, sums up the impression he believes is created by his drawing. Sometimes the artist is strongly aware of his particular style of drawing, but sometimes he is not, or perhaps finds it difficult to describe verbally what he can express graphically.

People differ in the extent to which they make use of sensory data, are able to assimilate it, and are able to select and use it wisely in a drawing. Because experience is such a unique and individual thing people must be allowed to create in the way that is best for them.

B. Catalog of Selected Drawings

(See following pages.)

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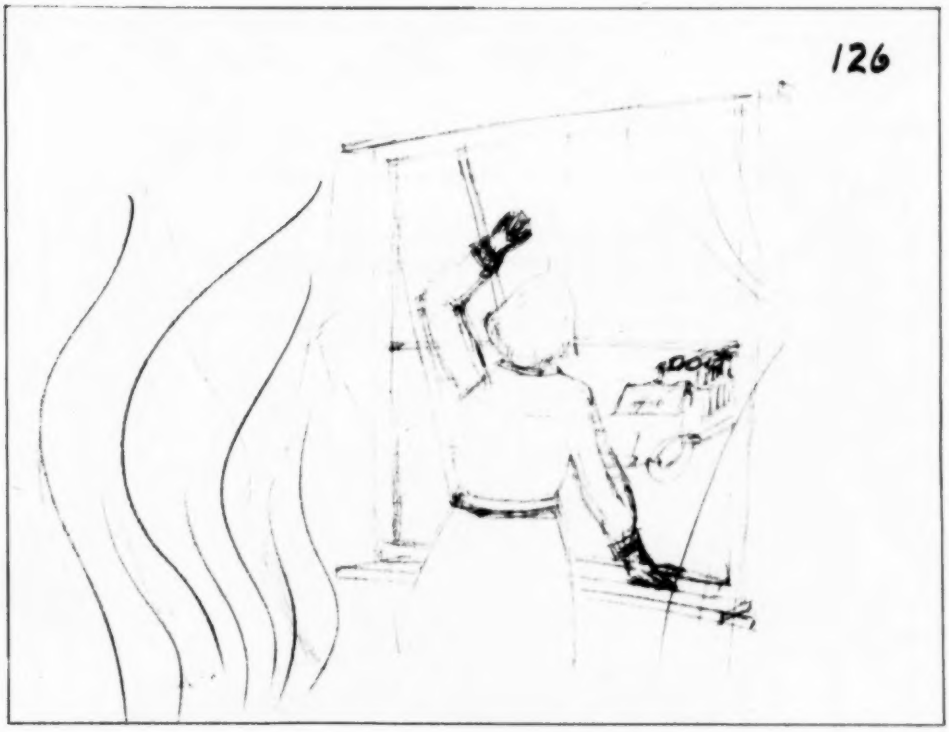
PREVENTION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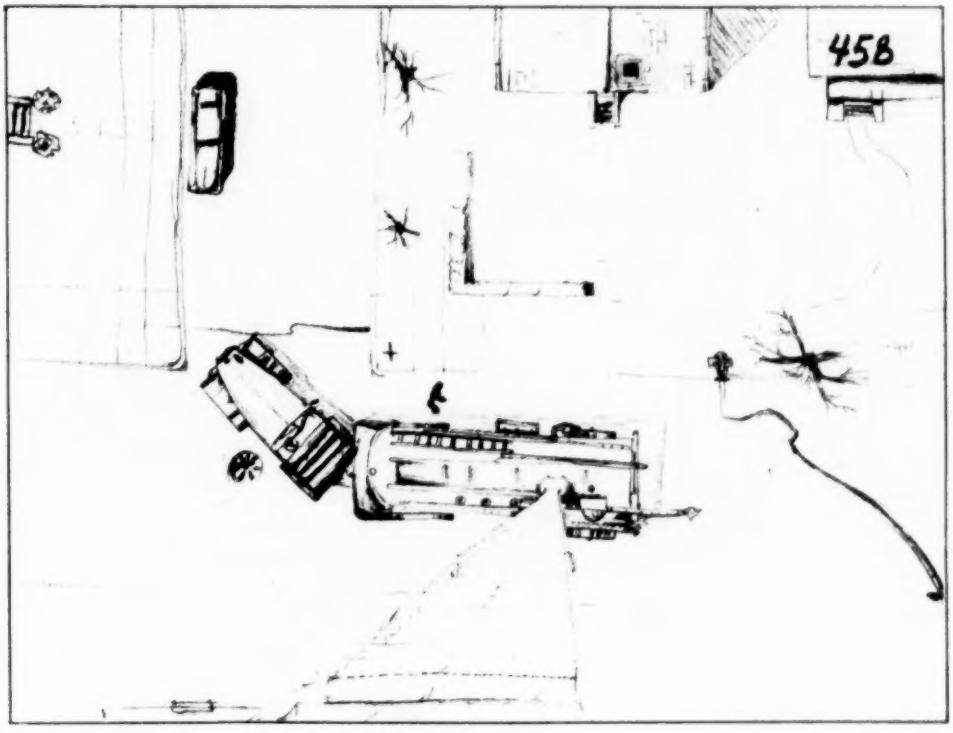
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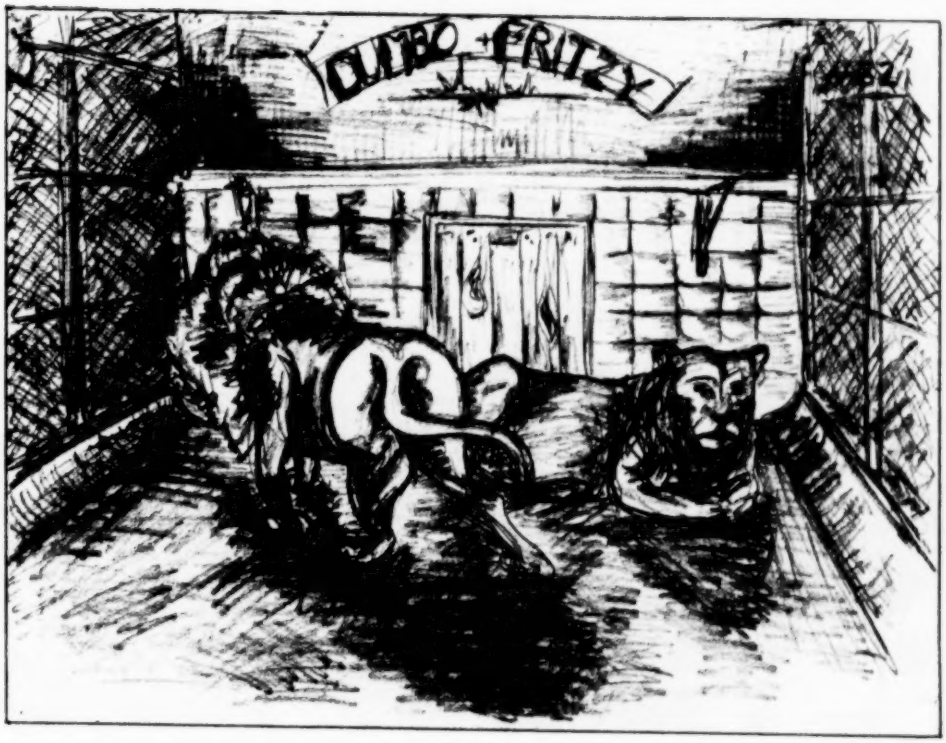
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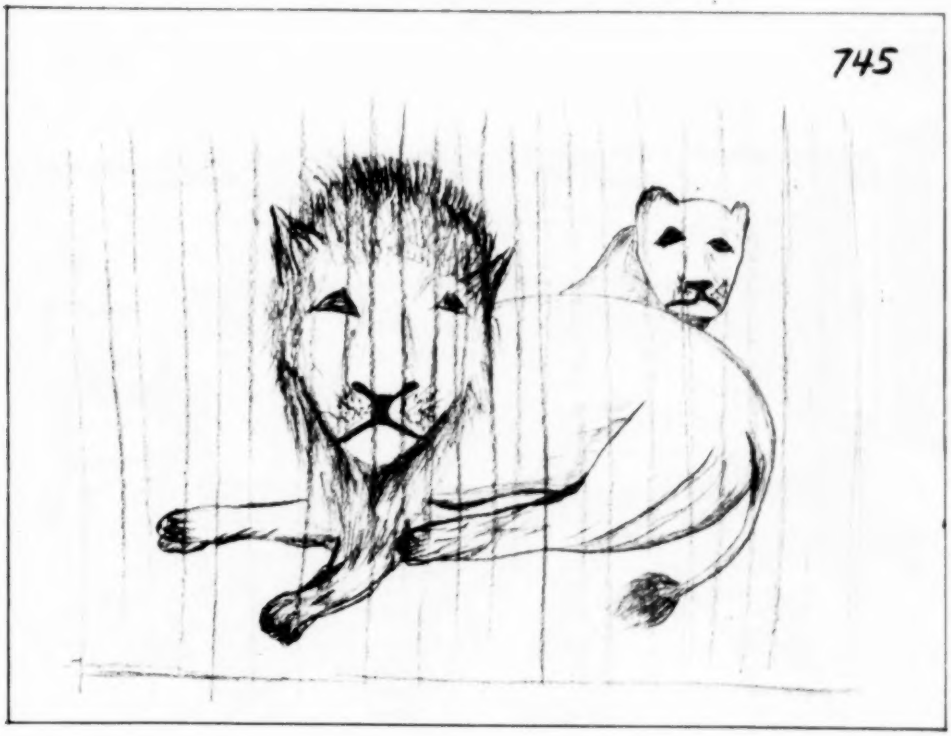
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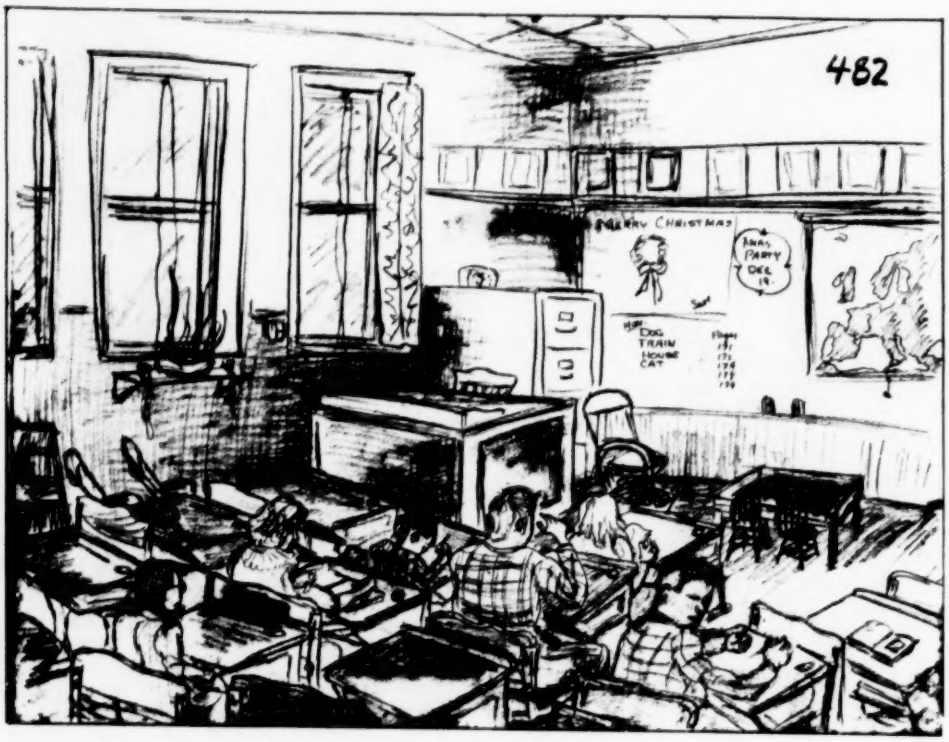
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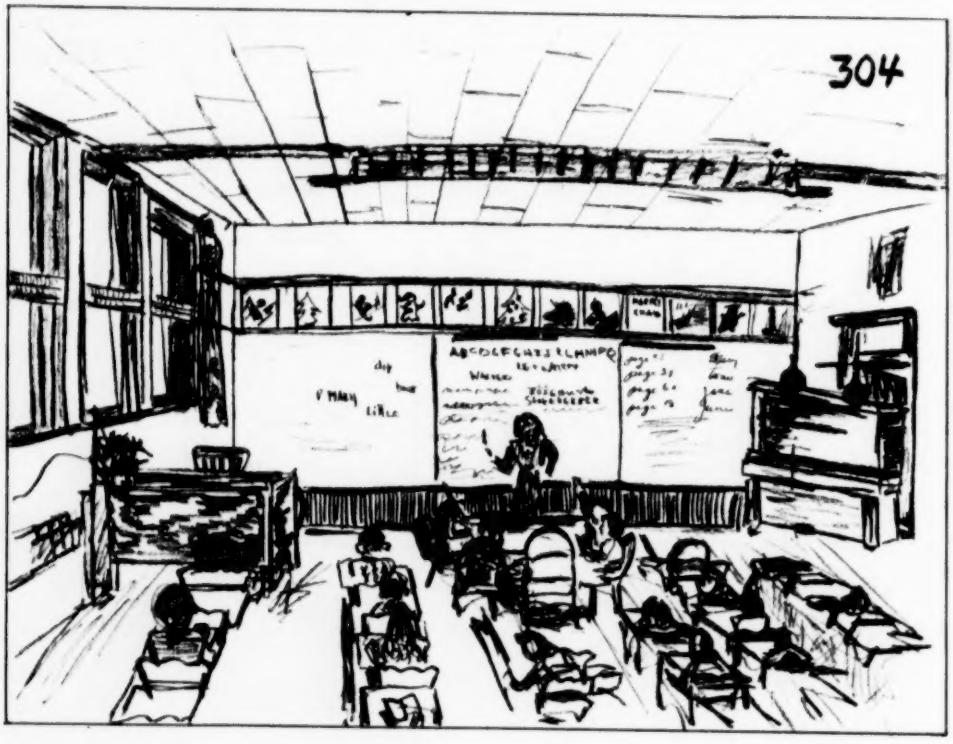
MERRY CHRISTMAS
XMAS PARTY DEC 19
DOG
TRAIN
HOUSE
CAT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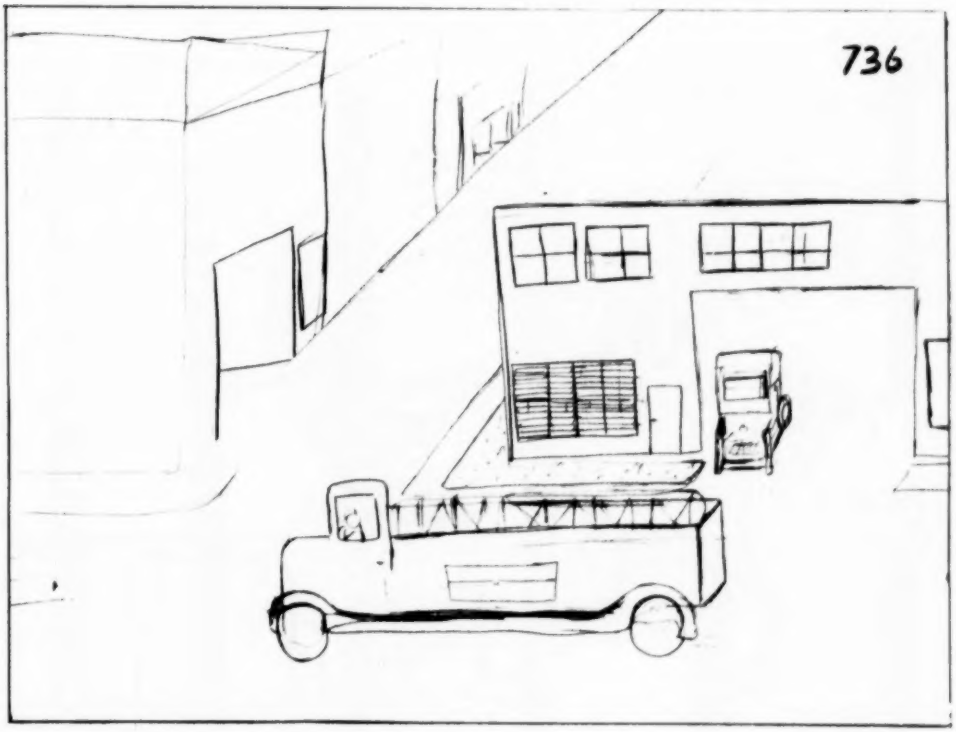
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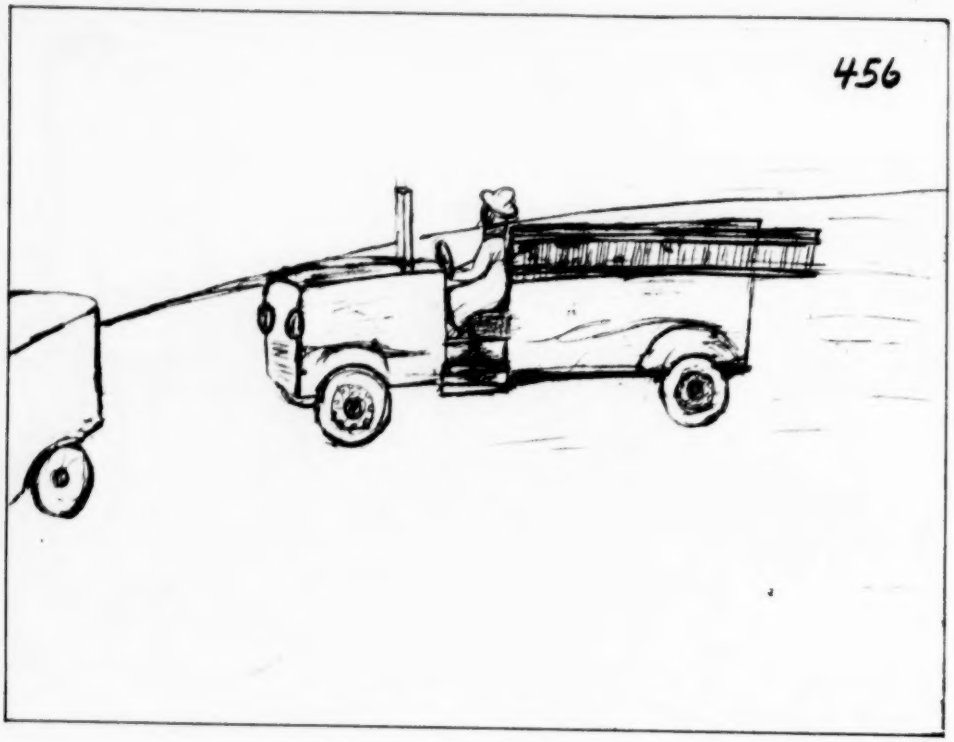
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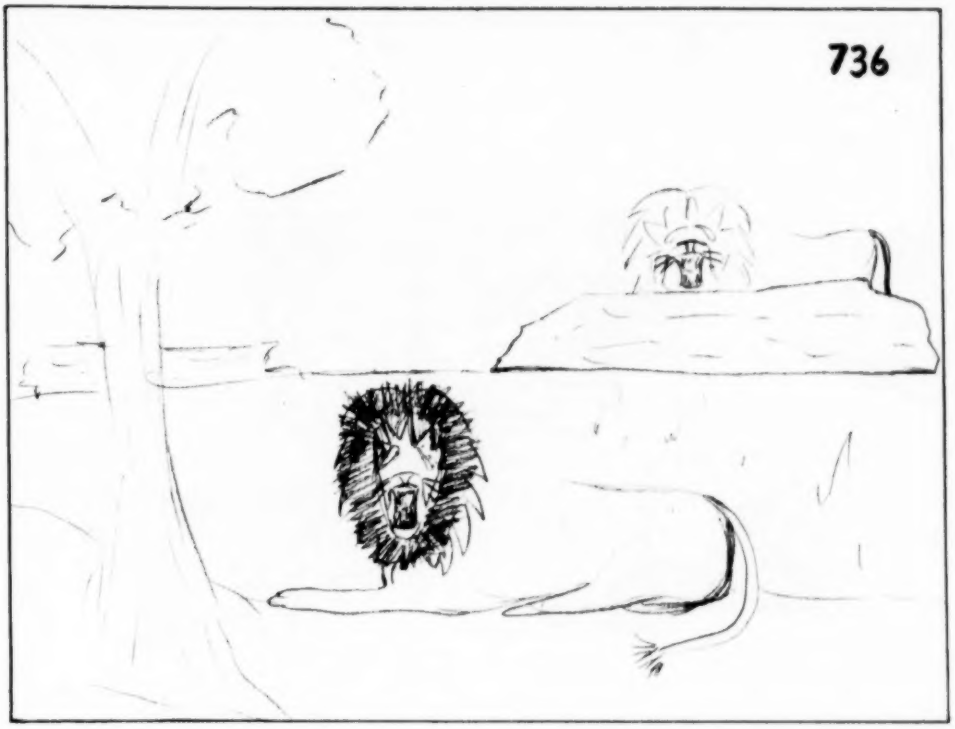
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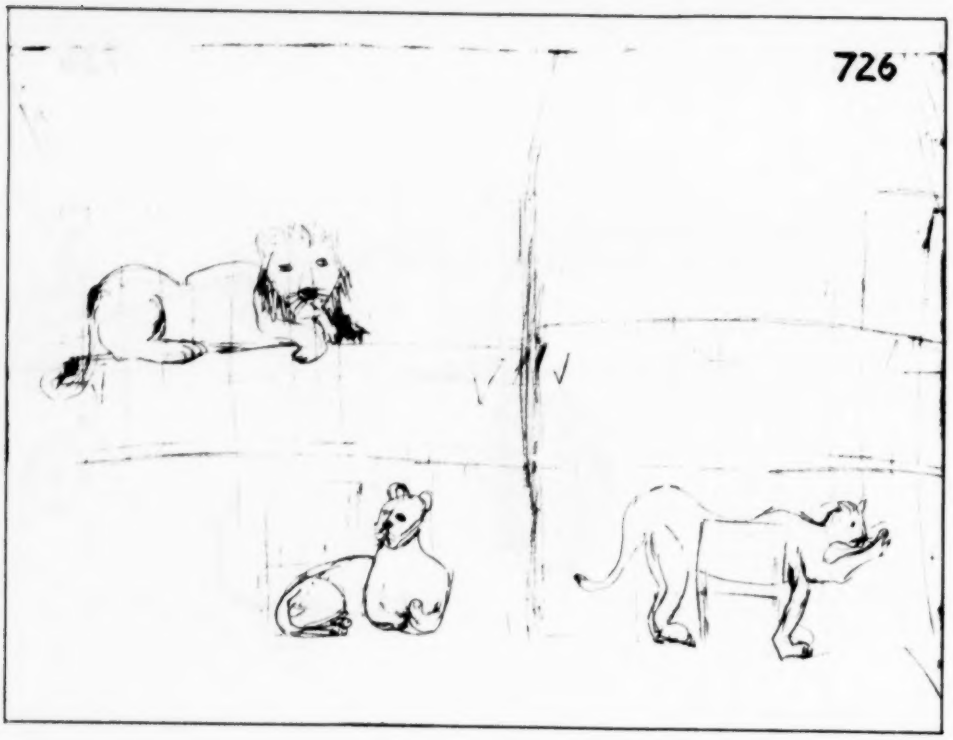
TIMMY
THE
LION CUB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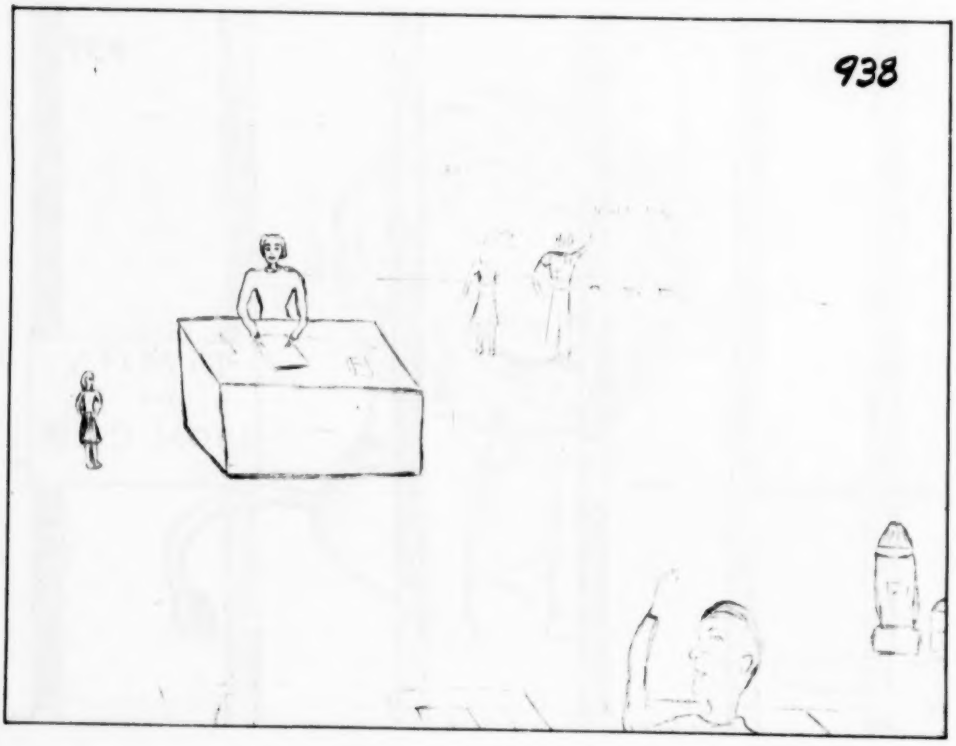
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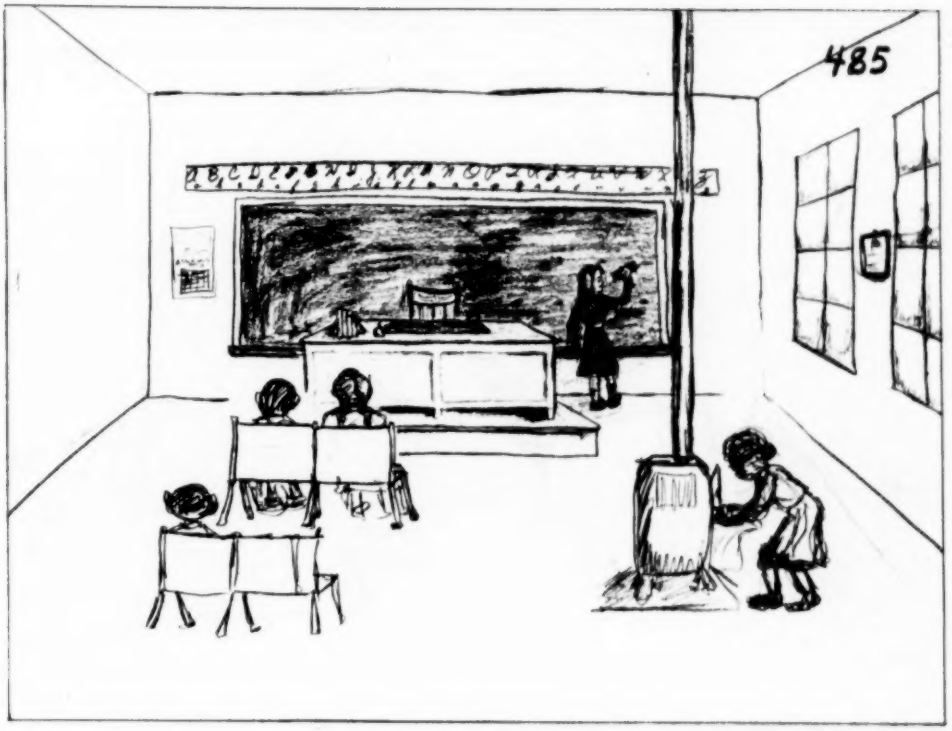
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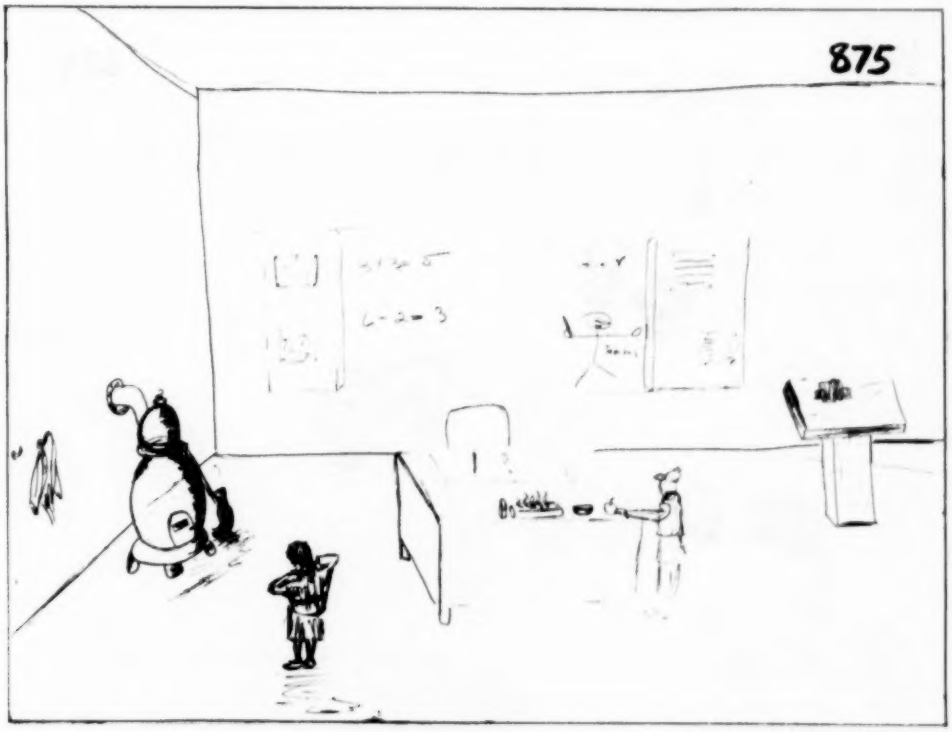
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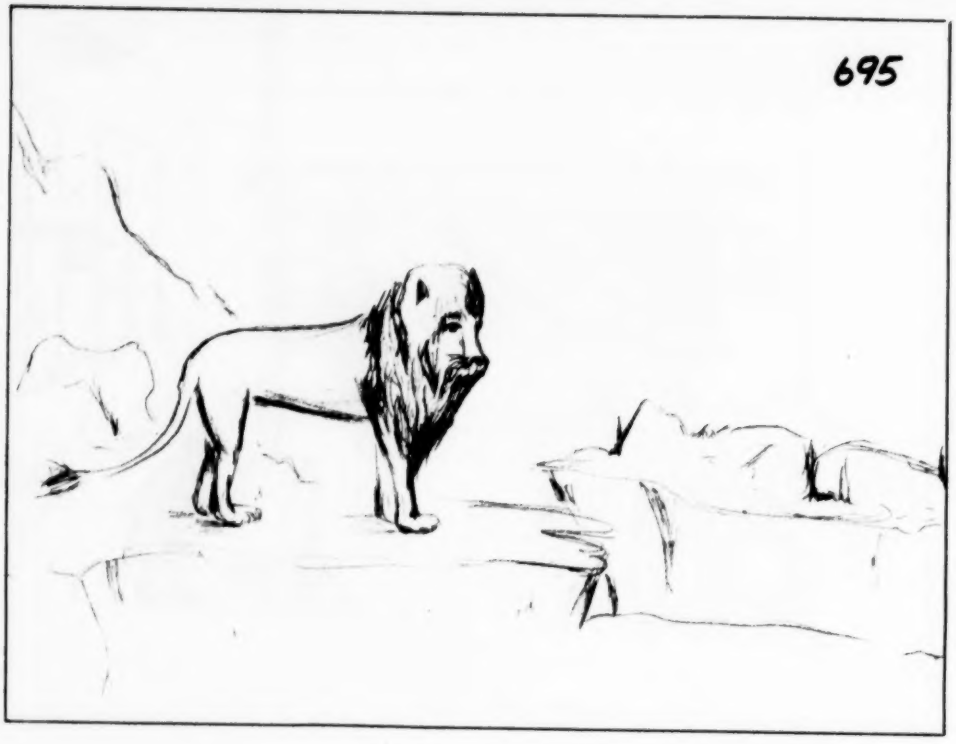
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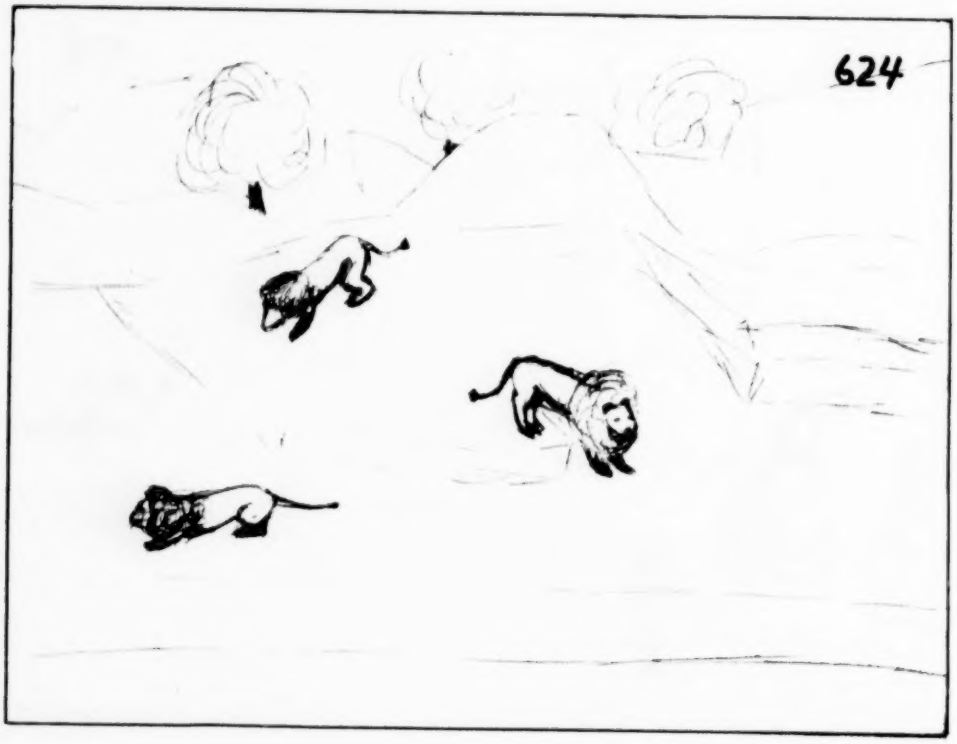
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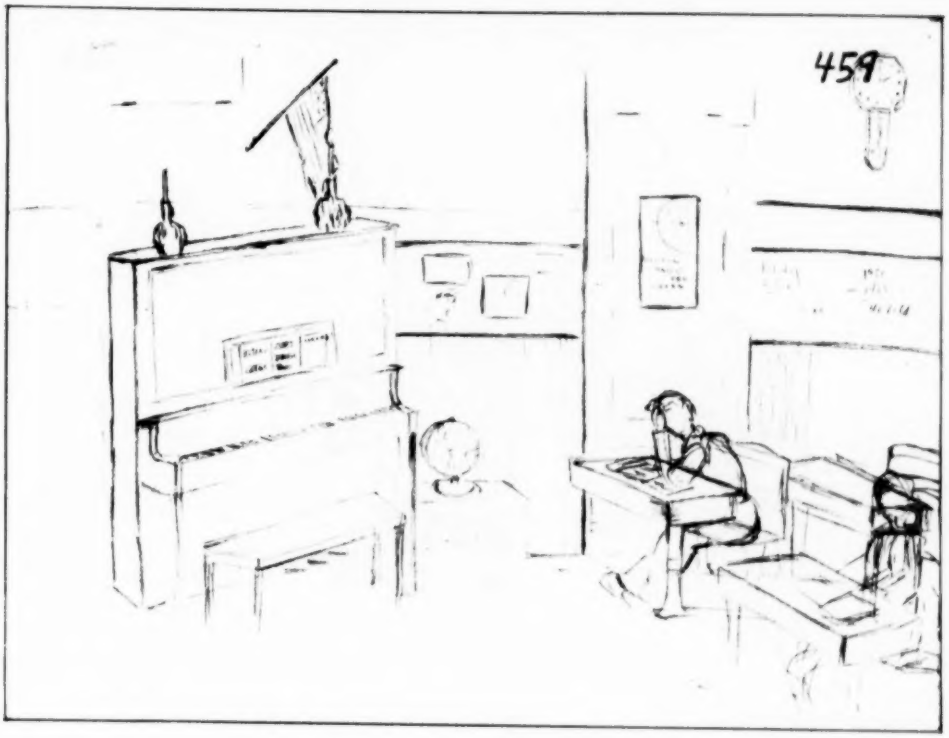
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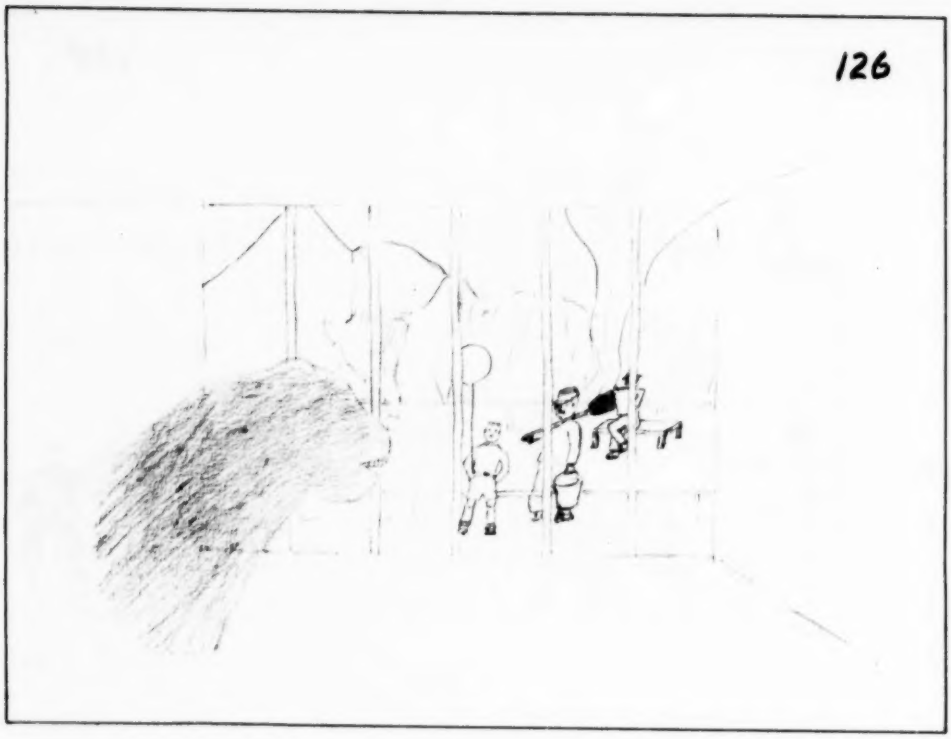
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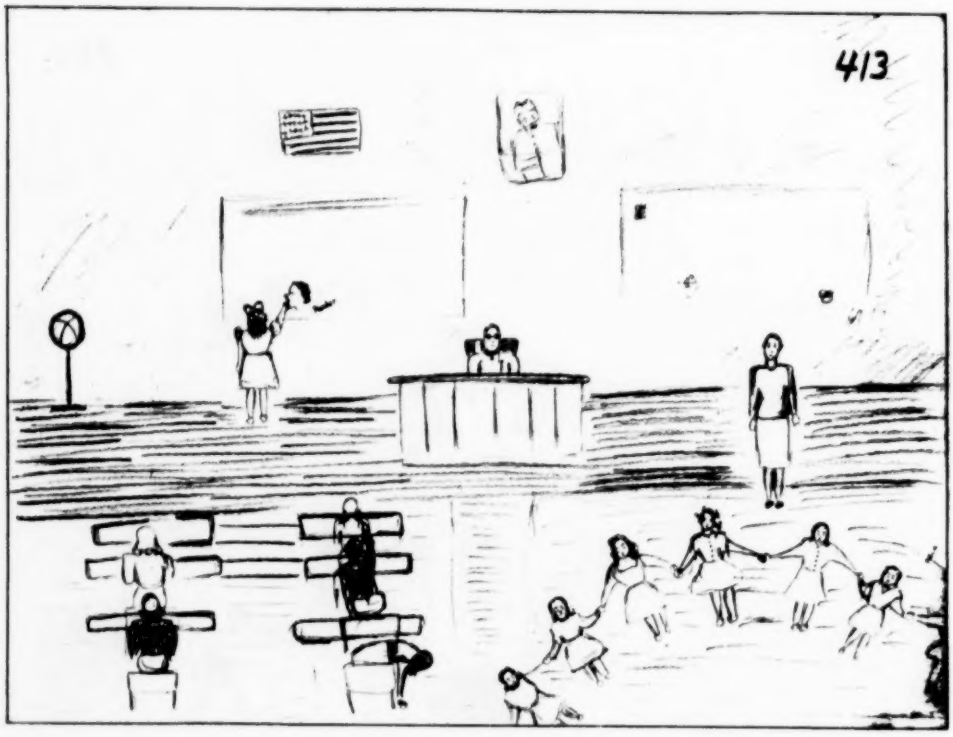
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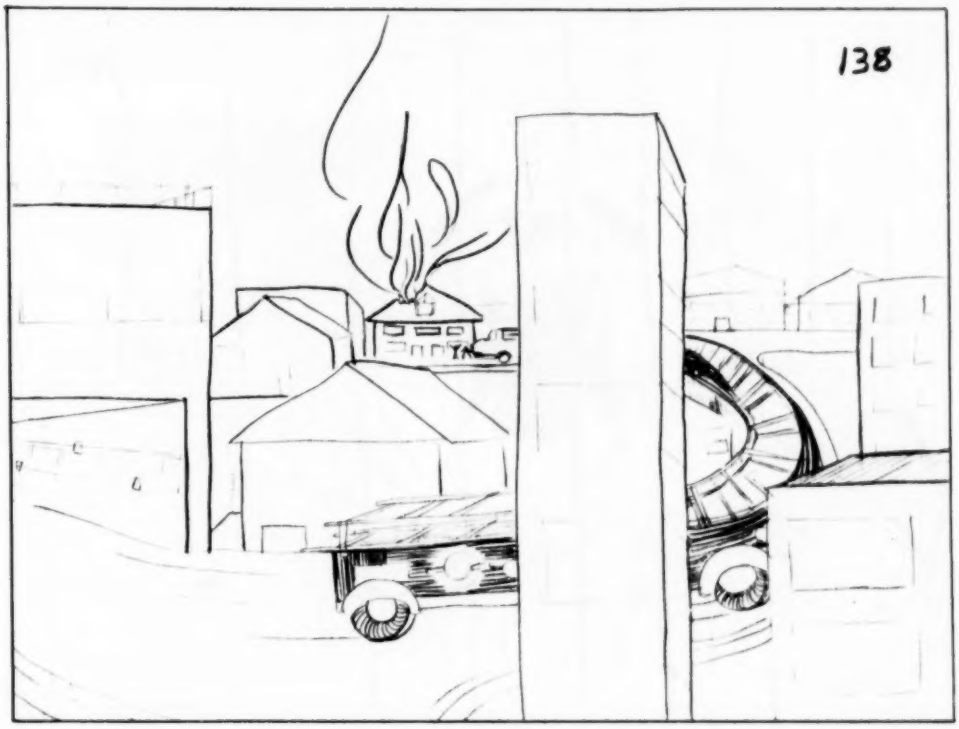
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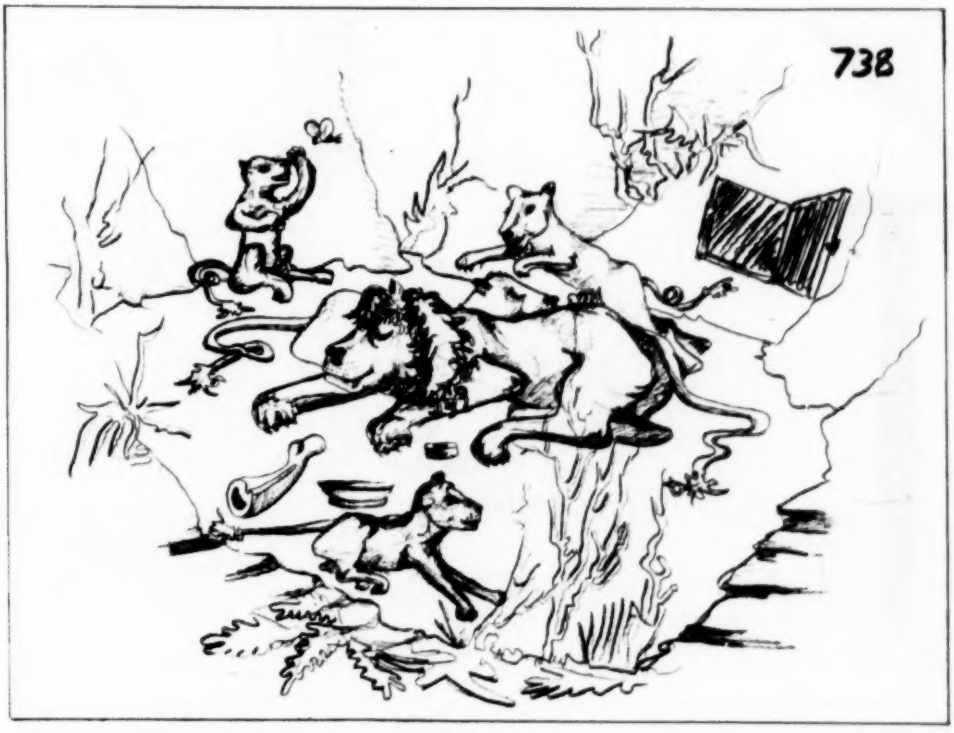
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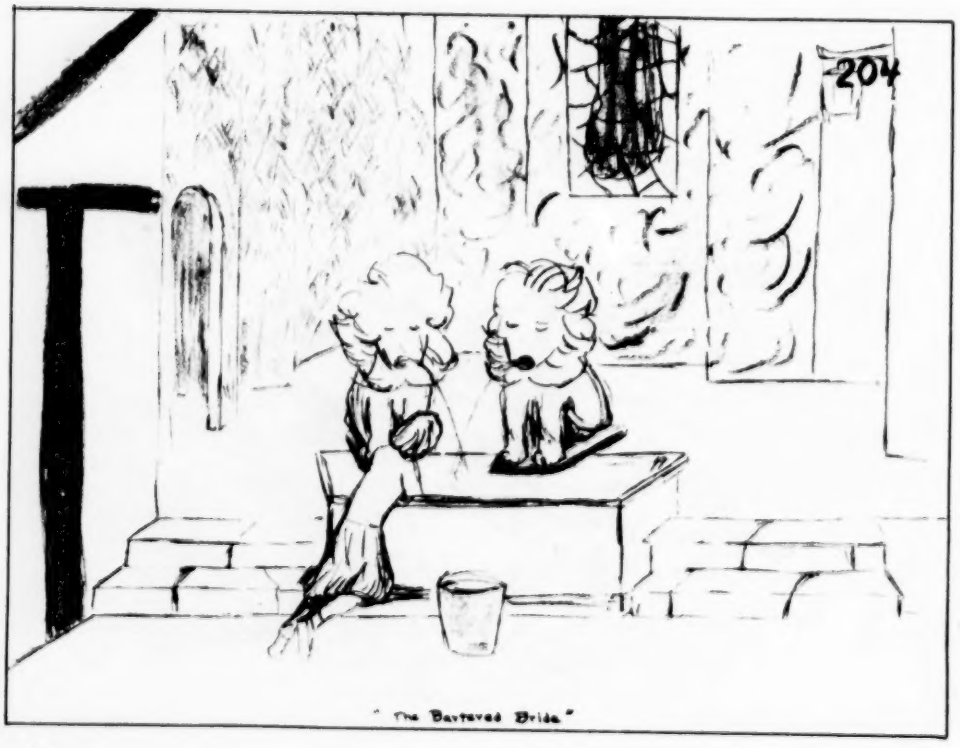
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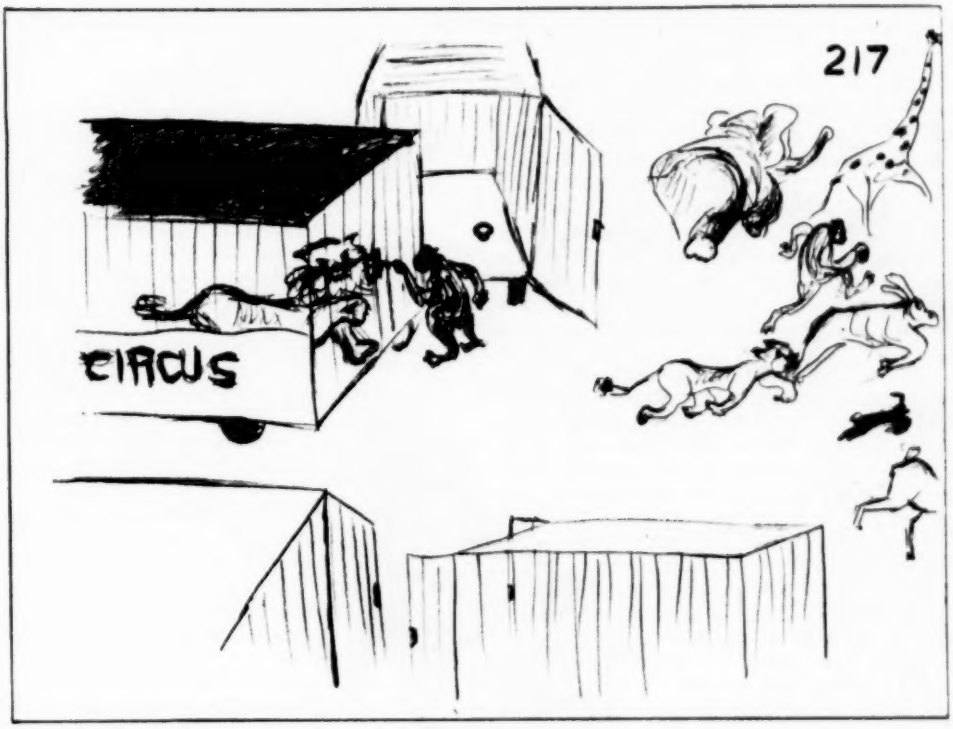
"The Bayteves Bride"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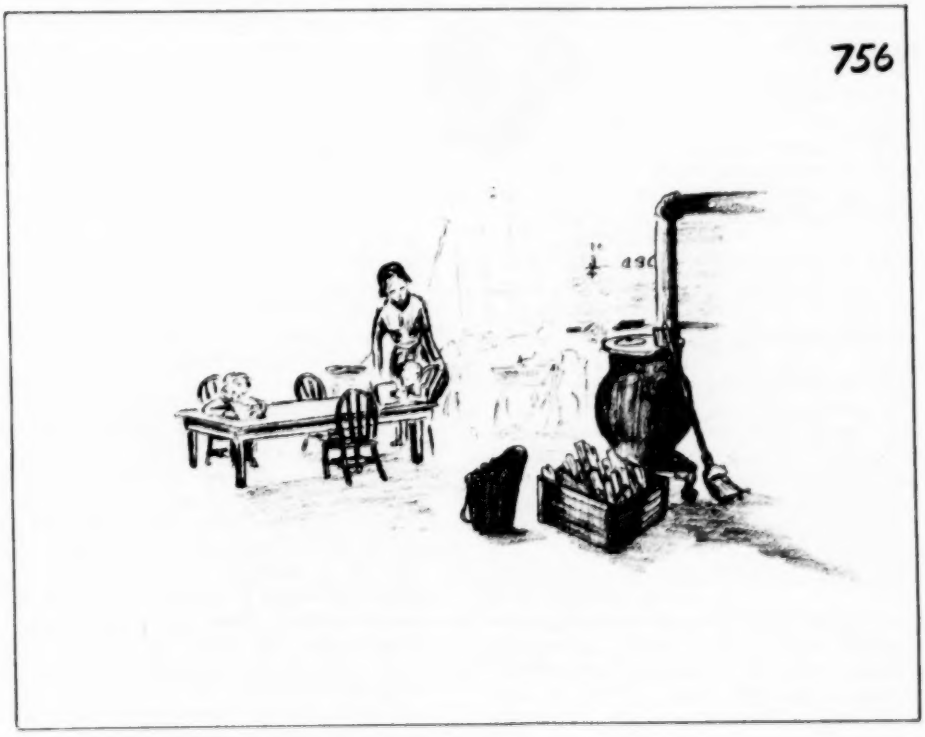
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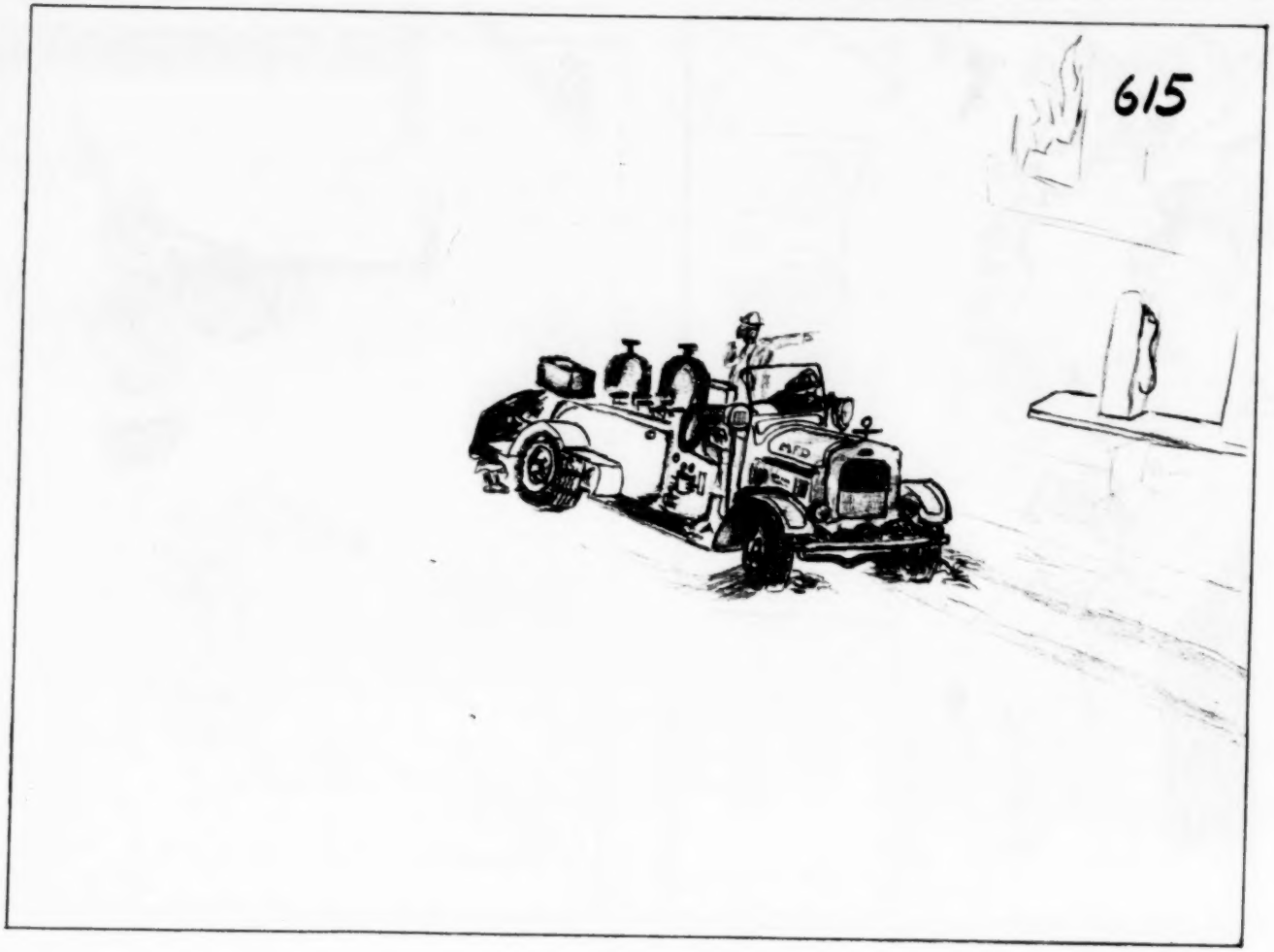
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SECTION V

SUMMARY OF THE INVESTIGATION

A. Summary and Conclusions

THE EXPERIMENTAL data growing out of this investigation, and the conclusions resulting therefrom, will be summarized in four general areas as follows:

1. Group performance for the three different art experiences
2. The reliability of individual performance in various groups
3. The evaluation of drawings
4. The contribution of student opinion

1. Group Performance for the Three Groups. —The study of the relative effects of the three different art experiences, as reflected in the drawings by participants, has revealed that some art experiences are more valuable than others for the production of drawings with merit. In one of the three comparisons made between groups with the analysis of variance technique the difference was large enough to be statistically significant at the .05 level of probability. The extent and direction of this difference was discovered by working out the critical ratios between the three groups. In one instance the Z group had an advantage over the Y group with a critical ratio significant at the .01 level. In another instance the X group had an advantage over the Y group with a critical ratio significant at the .05 level. The advantage that Z group had over the X group was not large enough to be statistically significant at either the .05 or the .01 level. These findings were amplified when 12 "Students T" scores comparing group performance on various action themes gave an advantage to Z group in every instance where it was compared to X group, and Y group; gave an advantage to X group wherever it was compared to Y group; and in some of these instances by an amount large enough to be statistically significant.

Thus, the statistical findings favor the Z group in every instance where it is compared with the other two. In every instance where X and Y are compared, the X group is superior.

2. The Reliability of Individual Performance in Various Groups. —An idea of the reliability of the performance by an individual of one group as compared with that of an individual of another may be had by an examination of individual scores. A few individuals whose drawings fluctuate the most in the ratings given by the five judges were chosen for study. Without special attention to the level of the ratings, if the amount is totaled that the individual varies from the mean of his five ratings, a general idea may be had of where the greatest variation exists. Following this plan, an examination will reveal individuals in the Z group as the most stable, those in the Y group the next most stable, and those in the X group the least stable.

Where coefficients of correlation were computed on two evaluations of a single action theme of 60 drawings, the Z group had the highest with .91, the Y group next with .90 and the X group somewhat lower with .76. The X group thus appears to be much less stable than groups Y and Z.

3. The Evaluation of Drawings. —Strict conformity of agreement is neither necessary nor desirable in the evaluation of drawings, especially since each judge relied upon his own personal criteria for the evaluation. In instances where judges agree to a large extent on the drawings of a particular action theme, there is no reason to believe that the same judges will agree to the same extent upon the drawings of a different action theme. Judges agree more with themselves than with each other, as might be expected. Judges have the least agreement on the subject matter of the 'animal' theme, to a greater extent on the 'machine' theme, and agree to the greatest extent on the 'people' theme.

A method of increasing the reliability of evaluation is possible where the judges are asked to make two evaluations of the same material, with allowance of a time lapse between evaluations. Correlations between two such evaluations of one judge will reveal which judges are the most reliable. Judges can then be divided into two groups: the 'most' reliable, and the 'least' reliable. The coefficient of correlation calculated between the two groups will reveal the extent of agreement, and where the correlation is too low, it may be desirable to use only evaluations of the 'most' reliable group.

4. The Contribution of Student Opinion. —A summary of student opinion acquired in connection with an investigation can be valuable in supplying information to supplement findings of a statistical nature, and can help to give an all round description of what the students are thinking, their interests, problem areas, and other things that aid in development of art experiences that are vital and interesting. Student opinion was sought concerning their own drawing in these areas: On which action theme do you think you made the best drawing? Is 45 minutes adequate time in which to make a satisfactory drawing? How would you describe your own particular 'style' or manner of drawing?

Most people thought that they made their best drawing on theme 3, the 'people' theme. The 45 minutes was considered by most people to be adequate. Some found it difficult to describe their own style, but the remarks in response indicated that most people were aware of their style being

in a 'stage' of developing.

B. Problems Suggested by This Investigation

Since the symbols of expression used in art are often very different than those used in speech, writing, and the use of numbers, the research in Art Education must surmount the fact that the non-verbal nature of expression increases the difficulties encountered in description and measurement. Traditional practices in art are in part responsible for some of the general problems faced by the investigator; examples of these are the tendency to set up a dichotomy of those who are 'good' in art and those who are not, the tendency to judge art from an adult standard, too much selection of students in the past, without adequate provision for the needs of all the students, and many others. Since the problems appear most naturally in question form, they are stated here in that form:

1. How can we relate art experiences more directly to the needs of everyday life?
2. Following the identification of needs of the students, how can we be sure that these are 'felt needs'?
3. How can we develop in the student capacity and desire for more continuous self-education to the end that each experience is meaningful and worthwhile?
4. To what extent can we plan art experiences around the current interests of the students?
5. In a situation where art experiences may be compared, what art experiences are of the most value for specific groups and for the individuals that make up these groups?

C. Implications of This Investigation for Education

To achieve the full potential of which we, as human beings are capable, and to fulfill our duty and obligation as citizens and leaders in a democratic society, we must know more about the relation of Art to human behavior in actual learning situations. The following appear to be important implications and ways of application of these findings, whether for the construction of a general art course, or for education in general:

1. Exposure to a variety of problem situations involving many and varied materials and methods of expression in the field of Art, allows the student to become acquainted with basic facts and principles important in the creative process. Through these problem situations the student is led to develop a personal system of values that constitute his personal art judgment, and help him to become an intelligent consumer, critic and creator of art products.

2. Art may be fostered under any number of stimulating conditions, and it is impossible to say that procedure A is better than procedure B for all situations, or for all people. However, in any situation, the teacher should be free to discuss issues with the students, make suggestions, point out alternate courses of action, guide and help each individual student in every way possible.

3. Because of the diversity and individuality of experience, there is no one appealing type of subject matter. Interests are as varied and numerous as the number of students in the class, so that offerings must be individualized to give purpose, stimulate effort, and give meaning to the content.

4. Various attempts must be made to adjust the learning experience to the way individual students learn. For example, some learn best through lecture and demonstration methods where the emphasis is on verbal learning; others, handicapped there, learn best in a laboratory situation where the actual manipulation allows more motor coordination in the learning process; while others may have to depend more upon a spacial expression in three dimensional media.

5. Development must be expected and encouraged on all levels, since experience is a continuous, cumulative thing. If we recognize this fact, at no point in the development process will the child be judged by adult standards.

6. If we tie our art experiences, as we must, to contemporary life, it is necessary that we go beyond the narrow limits of the classroom, to make curricular and co-curricular experience more meaningful and more functional for all.

A STUDY OF FOURTH GRADE CHILDREN'S COMPREHENSION OF CERTAIN VERBAL ABSTRACTIONS

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Temple University
Philadelphia, Pennsylvania

THE PROBLEM

Statement of the Problem

THE CHIEF purpose of this study was to investigate the ability of fourth-grade pupils to comprehend different verbal abstractions as identified in vocabulary common to primary grades. Specific data were obtained on the following questions:

1. What relationship exists between comprehension of verbal abstractions and background of information?
   a. between ability to classify ideas and background of information?
   b. between ability to index ideas and background of information?
2. What relationship exists between comprehension of verbal abstractions and intelligence?
   a. between classifying ability and intelligence?
   b. between indexing ability and intelligence?
3. What relationship exists between classifying and indexing ability?

Justification of the Study

The justification for this study may be established as follows:

1. To investigate the comprehension of certain verbal abstractions by employing them in tools designed to measure ability to classify and index ideas.

2. To determine to what extent the ability to classify and index ideas varies with intelligence.

Limitations of this Study

This study is concerned with the ability of a group of fourth-grade subjects to classify and index. To determine the extent to which subjects of this age group possess this ability, an Inventory on Background of Information, a test on Classifying Ideas, and a test on Indexing Ideas were administered. The verbal intelligence of the population of this study was determined by means of the Stanford-Binet Test of Intelligence, Form L, 1937 Revision.[1]

The Population. — Three populations were used in this study:

1. Population used for the experimental inventory on background of information. One hundred subjects were used; twenty-five cases in each of four grade levels.
   a. Sex. Both sexes were used in this study.
   b. Age. The chronological age range was from 6 to 10 years, inclusive.
   c. School Experiences. The cases selected for the study were obtained from grades one to four, inclusive.
   d. Geographical Area. The subjects were selected from Garrettford School in Drexel Hill, Pennsylvania.
2. Population used for the experimental tests on classifying and indexing ideas. Three hundred subjects were used; one hundred cases in each of three grade levels.
   a. Sex. Both sexes were used.
   b. Age. The chronological age range was from 8 to 11 years, inclusive.
   c. School Experiences. The subjects selected for the study were obtained from grades three to four, inclusive.

Present address: Illinois State Normal University, Normal, Illinois.

1. Published by Houghton Mifflin Co., Boston, Massachusetts.

d. Geographical Area. The subjects were selected from Garrettford School in Drexel Hill, Pennsylvania.

3. Population used for the final survey. One hundred fourth grade subjects were used.

a. Sex. Both sexes were used.
b. Age. The chronological age range was from 9 to 10 years, inclusive.
c. Intelligence. The intelligence quotient range was from 72 to 151.
d. Geographical Area. The subjects for the final survey were from nine fourth grades in Ridley Township School District, Pennsylvania.

Abstractions Used in this Study. —Three sets of primary basic readers and a set of science books were analyzed for 246 verbal abstractions: (1) Easy Growth in Reading Series,[2] (2) Curriculum Foundation Series,[3] (3) Betts Basic Readers,[4] and (4) The Wonderworld of Science.[5]

Tests Used in this Study. —One standardized test and three instruments that were constructed for this study were used. The Stanford-Binet Test of Intelligence, Form L, 1937 Revision, was the standardized test used to determine the verbal intelligence of the population. The other three instruments were: (1) an inventory on background of information, (2) a test on classifying ideas, and (3) a test on indexing ideas.

Statistical Procedures. —The subjects were given a series of tests to measure various abilities. To determine whether the instruments used to measure certain abilities were significant, two statistical techniques were employed:

1. The standard error of the difference between proportions was used to determine significance of items.
2. The reliability of the tests was established by using the split-half method and the Spearman-Brown "Prophecy-Formula."

The results obtained from the tests were compared by employing the Pearson Product Moment Formula. This technique was used because it provided a way of determining the relationship existing among various abilities.

Terminology

1. "Verbal Abstraction" is used synonymously with verbal concept. For example, the written symbol dog, representing a special animal, is a verbal abstraction or concept. Verbal concepts go up and down the ladder of abstraction. In order of increasing abstraction, more characteristics are omitted:

a. The descriptive or naming level is the lowest verbal level of abstraction. For example, Skippy, the name of a dog, is an abstraction at the lowest verbal level; it is still an abstraction since some characteristics of the real Skippy have been omitted.
b. The abstraction dog is at a higher level than Skippy since more characteristics have been omitted. Dog may not mean a special dog, but any dog at all.
c. The verbal abstraction animal is at a higher level than Skippy or dog. Still more characteristics have been omitted in the abstraction animal than in dog. Animal is a more general term than dog or Skippy.

2. "Category" is the term used to indicate a broad division or group in which persons, places, objects, or events having common characteristics can be placed. For example, animal is the group name or broad division to which dogs, cats, horses, etc., belong.

3. "Classifying" is the ability to put persons, places, objects, or events with similar characteristics or logical relationships in commonly accepted groups or categories. For example, man, dog, and horse have similar characteristics and can be placed in the animal category.

4. "Concept" is defined as a "meaning sufficiently individualized to be directly grasped and readily used, and thus fixed by a word."[6]

5. "Indexing" is the ability to name specific persons, places, objects, or events that have been placed in a special category by society. In the

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2. Gertrude Hildreth. Easy Growth in Reading Series (Philadelphia: John C. Winston Co., 1940).

3. William S. Gray and May H. Arbuthnot. Curriculum Foundation Series (New York: Scott, Foresman Co., 1941).

4. Emmett A. Betts and Carolyn M. Welsh. Betts Basic Readers (New York: American Book Co., 1948).

5. Warren Know, George Stone, and Doris Noble. The Wonderworld of Science (New York: C. Scribner's Sons, 1946).

6. John Dewey. How We Think (Boston: Heath and Co., 1910), p. 125.

animal category, the naming of a special type of animal, such as rat, would be indexing.

A REVIEW OF KINDRED LITERATURE

There are a large number of studies reported in the literature which bear upon different aspects of the broad problem of verbal abstractions or concepts as they are represented by words. Although no research was found dealing directly with classifying and indexing as defined in this study, the kindred literature reported in this section will provide a background for an understanding of the problem. The studies reviewed are referred to under the following three aspects of the problem: (1) how to develop concepts and their verbal representations, (2) measurement of concepts, and (3) concept burden of instructional materials.

How to Develop Concepts and Their Verbal Representations

Numerous experimenters investigating the area of concepts were interested in determining best teaching procedures rather than establishing principles of how to develop concepts. Inferences drawn from research into the way concepts develop and from the factors that influence their development provide the needed principles.

Direct Experience. —Findings from research reviewed on factors influencing concept development indicate that the more direct the experience on which the concept is built, the greater will be the individual's knowledge and understanding of that concept.

Direct experience is necessary in order to build concepts. It is impossible, however, for any one to develop all the concepts needed in modern life on the basis of direct experience alone. Vicarious experience must be utilized and much of it will be received through the medium of language. When verbal symbols are added to the old stock of established ones, it is essential that these initial concepts be formed on the basis of direct experience. In order to build concepts, then, it is necessary to provide experience in order to establish the simple concepts that will be combined and manipulated subsequently to form the more complex concepts. Concepts that can be traced back only to verbal language or symbols acquired through language result in mere verbalism.

Margaret Bedwell's (1) investigation established the fact that it is possible to have verbal or factual knowledge without having a functional concept. Practical experience, as she points out, is the most important factor in concept development. Sister M. B. Herbers (15) investigated the comprehension difficulties of 30 third-grade pupils. This study indicated that concrete materials and personal experiences are necessary to overcome verbalism. Osburn, Huntington, and Weeks (27) experimented with vicarious experience between the levels of direct experience and of verbalism. Their findings were that experiences with pictures, illustrations, models, and the like should be used to make concrete the relationships implied in language.

H. J. Sachs (30) makes the point that children do not acquire concepts by merely meeting words in context. He worked with 416 freshmen to determine the extent of their meaning vocabulary. His study shows the limitations of the reading method of improving vocabulary. The work of Ruth L. Sims (34) emphasizes that the role of experience is of utmost importance in the development of concepts. Helen B. Stolte (38), working with geographical concepts, draws the same conclusions. M. Theriesa Wiederfeld (43) in the field of history, concludes that building concepts necessitates providing experiences.

Vocabulary Development. —Much research devoted to determining the most effective means of increasing vocabulary assumes that enlargement of vocabulary is a virtue in itself without questioning the dimensions of the concepts with which words are associated. In that direction lies verbalism. In the mass, however, this research demonstrates that vocabulary is increased by experiences of two kinds:

1. Experience with the raw materials of the concepts for which given words are symbols; that is, experiences with objects and processes and with lower level concepts on which the required concepts are built.

2. Experience with the given word itself; that is, hearing the word, speaking the word; and reading and writing it.

Experience with the raw materials of concepts develops the concept; experience with the word associates word and concept.

Dunkel's (9) conclusion that the ability to determine the precise meaning of a word is related to the ability to read with comprehension gives the clue to the reason for the great quantity of investigations of word meaning and vocabulary development. He constructed a new type of vocabulary test. He was dissatisfied with the conventional type of test which assumes a "core-meaning" or "sphere of meaning" for each word. These tests, he felt, did nothing to test the student's interpretation of the precise meaning taken on by a word used in a particular situation. In Dunkel's test, words were used in a paragraph and then in five sentences. Subjects were to mark the item which had the same meaning as in the paragraph. This test was administered to subjects in the tenth, thirteenth, and fourteenth grades. He con-

cluded that:

1. The ability to determine the precise meaning of a word is related to the ability to read with comprehension.

2. Education and maturity lead to development of the ability to determine the precise meaning of a word.

Ralph Haefner (13), Harry K. Newburn (25), Glenda Liddell (18), H. J. Sachs (30), William S. Gray and Eleanor Holmes (11) are a few of the investigators concluding that it seemed possible to improve the vocabulary of a group of children and adults by merely exposing them for a few minutes each day to a new word. Vocabulary is acquired by casual learning and by formal drill.

Multiple-Meaning of Words. —Related, but somewhat opposed to the research in vocabulary building is the research in semantics. The investigator in vocabulary meaning assumes that the more words a child knows the more readily will his concepts be formed. The semanticist says, "Words do not mean what they say." But through semantics, another factor influencing concept development is recognized, i.e., the multiple-meaning of words.

The real significance of multiple-meaning arises from the fact that we receive so many of our concepts through stimuli in the form of words, spoken or written. No one can have all the experiences directly that are basic to understanding modern life. Vicarious experiences must be resorted to, and in practice much of it turns out to be in the form of spoken or written language. For the reception of language, there must be agreement upon the meanings of words. When words may have from one to a score of accepted meaning, the recipient is faced with a large sorting task with each sentence he receives. Let him fail to sort out the intended meaning of any one word and the concept he forms may be totally at fault.

One means of developing concepts is through extending vocabularies. The investigations of Blair (2), Curoe (7, 8), Gray and Holmes (11), Haefner (13), Liddell (18), Newburn (25), Sachs (30), Sanderson (31), Shannon and Kittle (33), Tate (39), Traxler (40), Waring (41), and Waters (42), all point out that direct study of words and their meanings is productive in extending vocabulary.

The Measurement of Concepts

In nearly all research in the field of concepts, investigators have experienced difficulty in their efforts to measure concepts. In practically all the studies in this area, measurement of some type was required. Attempts have been made to evaluate concepts by a number of devices.

Several types of testing can be adopted to measure the existence of a given concept. L. J. Cronbach (6), Ruth Looby (20), Hyman Meltzer (22), and Helen Stolte (38) found that the oral interview technique was a superior technique in measuring concept development.

Attempts have been made to measure concepts by causing the subjects to perform appropriate acts as an index of their presence. Margaret Bedwell (1), Cofer and Smith (5), Hazlitt (14), Long and Welch (19), Mott (23), Sims (35), Rashkis, Cushman, and Landis (28), and Chard and Swartz (4) employed various performance techniques to measure concepts in their research. Appropriate acts to demonstrate the concept of an object, relationship, or a principle is one type of performance test. Sorting stimuli, words, phrases, or objects to demonstrate the understanding of certain objects is a second kind of performance test. Neither type appeared to measure accurately the acquisition of concepts.

Many experimenters have used multiple-choice tests to measure knowledge of word meaning. V. H. Kelley (17) concluded that the five types of objective word meaning tests he used in his investigation did not possess sufficient validity to make it valuable as an instrument for measuring the total word meaning knowledge of children. Cronbach (6), Dunkel (9), Eskridge (10), Serenius (32), and Stalnaker (37) concluded that selected distractors should be used in multiple choice tests.

Murphy (24) added free association tests to his investigation. He worked with college freshmen. He found association tests to be a device useful in supplying an index to concepts. Buswell and John (3) investigated the vocabulary of arithmetic. They found that the ability to make an association of an appropriate word with a concept cannot be taken as evidence of the extent of a concept.

There is agreement among experimenters that regardless of the technique used in measuring the development of a given concept, the ability to utilize a concept in one situation is not an index that it can be utilized in other situations.

Concept Burden of Instructional Material

Pertinent research establishes the fact that the concept burden of instructional materials is too heavy. It points to growing tendency to lighten the load in content-subject textbooks and more particularly in the series of books designed for basal reading instruction. It emphasizes the need to consider the concept burden as well as the vocabulary burden of instructional materials and suggests a growing concern with the distinction between well established concepts based on experiences and mere verbalism.

Some of the studies in this area have little or

no individual statistical significance and their specific findings are open to question. The agreement among them, however, cannot be ignored.

Social Studies

Bedwell (1) studied children's comprehension of concepts of quantity in third grade social studies reading materials. Both definite and indefinite terms were found to be of differing degrees of difficulty. Children demonstrated that it was possible to have a factual knowledge of a term without having a functional concept of the same term. Even in the restricted field of concepts of quantity at the third reader level, the load was too heavy for the children and verbalism resulted. Definite and indefinite terms for quantity were misinterpreted because children lacked concepts based on experience. This makes it clear that concept burden is relative, to be evaluated only in terms of the established concepts of intended readers.

Ritter (29) very carefully studied the words and meanings (and by inference, the concepts) used in two popular fourth grade geography textbooks. Her findings are glaring when contrasted to the usual vocabulary burden of basal reading series. In the more recent basal reading books for grade four, the authors, who can be presumed to have given careful consideration to children's capacity to acquire new vocabulary effectively, introduced roughly 1000 new words. Ritter found that 2195 technical, difficult, or unusual terms are introduced in one fourth grade geography. In the basal reading instruction nothing is more important than the building of reading vocabulary on the basis of well-established concepts. In geography texts, vocabulary is relatively incidental. One author of a geography text doubles the burden the authors of readers feel children can carry.

Springman (36) in a study of sixth grade pupils' understanding of statements in social studies textbooks found that only about half of the children fully comprehended the statements. He concluded that the concepts were much too heavy a load for the children he tested and it can be implied that it would constitute excessive burden for many children.

Basal Reading Materials

Marcum (21) made a direct attack upon the concept burden of primary basal reading materials. She analyzed the concept burden of primary basal reading material. She analyzed the concepts expressed in fifteen series of preprimers, primers, first, and second grade readers, and found the following total number of concepts at the indicated levels:

1. 110 different concepts in 15 preprimers
2. 406 different concepts in 15 primers
3. 719 different concepts in 15 first readers
4. 1487 different concepts in 15 second readers

At any one level, not more than 17 concepts were common to all series, only one concept was common to all preprimers.

Sims (34) concluded that the concepts which a child will need for handling materials adequately through reading can be determined by analysis. She recommended the compilation and use of "concept vocabularies" or "concept lists."

Ogle (26) found that the concept burden varied from one series of basal readers to another at the primary level. He classified the concepts and found twice as many relating to house and home as in any other classification, with concepts of metals occurring least often.

As of 1938, Hockett (16) reported that the basic vocabulary of "recent" primers and first readers was not as extensive as in older books. There was more repetition of words in "recent" readers than in earlier editions. There is no evidence that this trend has been reversed. Fewer words and more experience with them is the major promise of the authors of basal readers. The same approach could well be assigned to the treatment of concepts.

Gunderson (12) found some hopeful signs in 1942. She concluded that:

1. Basal readers for the first three grades make provision for the development of meaning vocabularies in verbs.
2. The large number of synonyms introduced at progressive levels enabled children to become aware of the common as well as the more specific meanings of words.
3. The vocabulary load increases from the preprimer to the third reader for growth in accuracy of comprehension and depth of interpretation.
4. More colorful and precise words are introduced in the second and third readers for finer interpretation, developing shades of feeling, and a sensitivity for meaning.

Gunderson's study dealt with words and their meanings rather than with concepts. She analyzed ten sets of readers. Her study shows the serious attention given by authors of basal readers to the nature of learning in children.

The real harm in overloading instructional materials with concepts is that overloading produces verbalism (or no learning at all). Looby (20) found in investigating the understandings children in the sixth grade derive from their reading of literature that verbalism is rampant. Children's understanding of "the stern of the ship" placed the stern from one end of the boat to the other. "Breathing

ing space" meant a space in the mouth. A man who was "slain" meant that he had servants. Yet children read and used these words.

In books overloaded with difficult terms, a large portion of these terms are not associated in any usable manner with established concepts. In some cases, children can ascribe no meaning to the terms; in other cases they ascribe wrong meanings, vague meanings, or partially correct meanings. In any case, where correct meaning is not ascribed, the best that can result from reading the term is verbalism.

PROCEDURES

This study was chiefly concerned with evaluating certain abilities involved in comprehension of concepts at different levels of complexity. To measure relationships existing among these abilities, two main procedures were followed: construction of instruments, and a survey employing them.

Before it was possible to conduct the survey, three tests needed to be constructed: (1) Background of information inventory, (2) tests on classifying ideas, and (3) tests on indexing ideas. For the background of information inventory, primary reading materials, currently used, were analyzed for 246 general and science concepts. These concepts were readily classified at different levels of abstraction. Background of information for these concepts was determined by constructing and standardizing an inventory covering the 246 concepts. The initial inventory of 246 items was revised on the advice of "expert" judgment. It was then administered individually to a population at four different grade levels: 25 subjects in each of grades one, two, three and four. The level of difficulty of items was established by two criteria: (1) each item was answered correctly by at least 88 percent of the subjects in the fourth grade; and (2) each item was answered correctly by an average of 76 percent or less by the subjects in all four grades.

A final inventory of 100 items was constructed based on the results of the experimental inventory. Reliability was obtained on the hundred items that met the criteria established for level of difficulty of items. The techniques employed to estimate reliability were the (1) Split-Half Method, and (2) the Spearman-Brown "Prophecy-Formula." The reliability coefficient was estimated to be .98, corrected .99.

Preliminary and final tests on classifying of ideas were constructed. Concepts common to the final inventory were included in these tests. An analogy technique was employed throughout the test. The following criteria were followed in building the analogies:

a. Two abstractions were used in the first part of the analogy. The first abstraction was a lower level abstraction than the second one; e.g., Sally is to girl. Sally is a lower level verbal abstraction than is girl.

b. One abstraction was used in the second part of the analogy. It was coordinate with the first abstraction used in the analogy; e.g., as Bob is to. Bob is at the same level of abstraction as Sally. Bob and Sally are coordinate levels of verbal abstractions.

c. Three choices were given in each analogy. The choices were at three different levels of abstractions; e.g., brother, Billy, boy.
   1) Brother is a higher level verbal abstraction than is Billy but lower than boy.
   2) Boy is a higher level verbal abstraction than brother or Billy.
   3) Billy is the abstraction at the lowest "level."

d. The choice representing the best answer was coordinate with the second abstraction in the first part of the analogy. Boy is coordinate with girl, the second verbal abstraction in the first part of the analogy.

e. The abstraction representing the best answer was alternated; it was not in the same position for more than two consecutive analogies.

The experimental classifying test of 56 analogies was administered to a population at three grade levels: one hundred subjects in each of grades three, four, and five. The Z-score of each item in the tests taken by third and fourth grade subjects was determined by the standard error of the difference between proportions. The Split-Half Method and Spearman-Brown "Prophecy-Formula" were employed to estimate a coefficient of reliability of .94, corrected .97.

The fifty items included in the final test on classifying met the following criteria:

1. Combined data of each item between grades three and four giving Z-Score of at least 3.13, significant at the one percent level. Z-Score was determined by Standard Error of the Difference Between Proportions; in this case, top one hundred and bottom one hundred.

2. Each item on the test taken by fourth grade subjects having a Z-Score of at least .40. Fifty items selected in order to have a mean Z-Score of 2.00, significant at the 5 percent level. Z-Score was determined by the Standard Error of the Difference Between Propor-

tions; in this case, using the top fifty and bottom fifty.

3. Minimum increase of eighteen percent correct responses for each item from the third to the fourth grade level.

4. Percent of correct responses for each item in the fifth grade tests the same or higher than in the fourth grade.

The items selected were arranged in order of increasing difficulty as indicated by fourth grade data.

Experimental and final tests on indexing ideas were constructed following the same procedures as in the classifying tests. The following criteria were followed in making the analogies for the indexing test:

a. Two abstractions were used in the first part of the analogy. The first abstraction was at a higher level abstraction than the second one, e.g., Bird is to robin. Bird is a higher level verbal abstraction than robin.

b. One abstraction was used in the second part of the analogy. It was coordinate with the first abstraction used in the analogy, e.g., as insect is to. Insect and bird are coordinate levels of verbal abstractions.

c. Three choices were given in each analogy. The choices were at different levels of abstraction, e.g., grasshopper, animal and life.
   1) Grasshopper is a lower level abstraction than is animal or life.
   2) Animal is a higher level abstraction than grasshopper but a lower level than life.
   3) Life is a higher level abstraction than grasshopper or animal.

d. The choice representing the best answer was coordinate with the second abstraction in the first part of the analogy, e.g., grasshopper is coordinate with robin. Grasshopper is the best answer.

e. The abstraction representing the best answer was alternated; it was not in the same position for more than two consecutive analogies.

The same population was used in the indexing test as in the classifying test. The Z-Score of each item in the tests taken by third and fourth grade subjects was determined by the standard error of the difference between proportions. The Split-Half Method and Spearman-Brown "Prophecy-Formula" estimated the coefficient of reliability to be .88, correct .88.

The fifty items that were included in the final test on indexing ideas met the following criteria:

1. Combined data of each item between grades three and four giving a Z-Score of at least 3.00, significant at the one percent level. Z-Score was determined by the standard error of the difference between proportions; in this case, top one hundred and bottom one hundred.

2. Each item on the test taken by fourth grade subjects having a Z-Score of at least .40. Fifty items selected in order to have a mean Z-Score of 2.02, significant at the 5 percent level. Z-Score was determined by the Standard Error of the Difference Between Proportions; in this case, using the top and bottom fifty.

3. Minimum increase of eighteen percent of correct responses for each item from the third to the fourth grade level.
   a) Fourth grade subjects. All ninety-four subjects in three fourth grade rooms were tested. Six additional fourth grade pupils were chosen at random from another fourth grade class.
   b) Fifth-grade subjects. In three fifth grade classes there were ninety-seven pupils. Three pupils from another fifth grade class were added.

After the preliminary steps of constructing and standardizing instruments were completed, the final survey was made. The three instruments were administered to one hundred fourth grade subjects. The subjects had been administered the Stanford-Binet Test of Intelligence, Form L, 1937 Revision, during their first year of school. The purpose of the survey was to investigate relationships that exist among the comprehension of verbal abstractions, background of information, and intelligence. The Pearson Product Moment Coefficient of correlation was employed to determine relationships among abilities.

SUMMARY OF RESULTS

The experimental Inventory on Background of Information was administered to subjects at four grade levels, to determine the discriminative value of its items. A summary of data is presented in Table I.

The combined data on the experimental Inventory on Background of Information taken by 100 subjects in four grade levels are summarized in Table II. These data are concerned with item difficulty for the total population.

Experimental Test on Classifying Ideas

The data from the experimental test on classifying ideas will be presented in two categories:

TABLE I

EXPERIMENTAL DATA INVENTORY ON BACKGROUND OF INFORMATION: PERCENT OF POPULATION WITH CORRECT ITEMS BY GRADE LEVELS

(25 Subjects at Each Grade Level)

Percent of Population	Grade I No. of Correct Items	Grade II No. of Correct Items	Grade III No. of Correct Items	Grade IV No. of Correct Items
100		1	4	36
96		0	6	31
92		2	8	16
88		3	6	52
84	1	2	8	4
80	1	3	16	3
76	0	5	5	11
72	0	8	6	5
68	1	6	9	3
64	0	7	7	6
60	2	10	7	4
56	3	4	6	2
52	5	5	6	5
48	4	6	17	8
44	2	4	9	9
40	10	9	12	3
36	5	11	8	6
32	8	10	9	8
28	9	11	9	5
24	5	10	2	2
20	8	12	10	0
16	13	10	8	2
12	10	19	17	6
8	27	19	9	3
4	27	18	15	9
	141	195	219	239
No. Items Failed	105	51	27	7
Total No. of Items	246	246	246	246

TABLE II

EXPERIMENTAL DATA ON INVENTORY OF BACKGROUND OF INFORMATION: AVERAGE PERCENT OF TOTAL POPULATION WITH CORRECT ITEMS

(25 Subjects in Each of Grades I, II, III, and IV)

Average Percent of Total Population	Number of Correct Items
80 - 89	8
70 - 79	21
60 - 69	25
50 - 59	27
40 - 49	36
30 - 39	35
20 - 29	25
10 - 19	36
1 - 9	26
	239
No. of Items Failed	7
Total No. of Items	246

TABLE III

SUMMARY OF DATA ON EXPERIMENTAL CLASSIFYING TEST FOR THREE GRADE LEVELS

Scores	Grade III f	Grade IV f	Grade V f
55 - 59			2
50 - 54	1	1	11
45 - 49	8	15	23
40 - 44	13	26	28
35 - 39	14	28	21
30 - 34	22	24	14
25 - 29	21	4	1
20 - 24	11	2	
15 - 19	8		
10 - 14	2		
Total No. of Subjects	100	100	100
Mean	31.65	38.05	41.95
SD	9.35	6.10	6.50

TABLE IV

SUMMARY OF DATA: ITEM ANALYSIS FOR EXPERIMENTAL TEST ON CLASSIFYING IDEAS

(100 Subjects in Grades III and IV)

Z-Score for Items	Grade III No. of Items	Grade IV No. of Items	Grades III - IV (Combined Data) No. of Items
.12 - 1.95*	12	26	1
1.96 - 2.57**	23	11	1
2.58 - 6.36***	21	19	54
Total No. of Items	56	56	56

* Not significant
** Significant at the 5 percent level
***Significant at the 1 percent level

TABLE V

SUMMARY OF DATA ON EXPERIMENTAL INDEXING TEST FOR THREE GRADE LEVELS

Scores	Grade III f	Grade IV f	Grade V f
50 - 54			1
45 - 49		7	9
40 - 44	2	10	27
35 - 39	14	25	22
30 - 34	15	27	26
25 - 29	17	16	12
20 - 24	26	10	3
15 - 19	14	4	
10 - 14	12	1	
Total Population	100	100	100
Mean	24.95	32.70	36.45
SD	5.90	6.85	8.27

TABLE VI

SUMMARY OF DATA: ITEM ANALYSIS FOR EXPERIMENTAL TEST ON INDEXING IDEAS

(100 Subjects in Grades III and IV)

Z-Score for Items	Grade III No. of Items	Grade IV No. of Items	Grades III - IV (Combined Data) No. of Items
.00 - 1.95*	27	19	2
1.96 - 2.57**	20	32	1
2.58 - 6.36***	9	5	53
Total No. of Items	56	56	56

* Not significant
** Significant at the 5 percent level
***Significant at the 1 percent level

TABLE VII

SUMMARY OF DATA: FINAL INVENTORY ON BACKGROUND OF INFORMATION

(100 Fourth Grade Subjects)

Scores	Grade IV f
91 - 100	63
81 - 90	28
71 - 80	3
61 - 70	4
51 - 60	2
Total Population	100
Mean	90.54
SD	9.86

TABLE VIII

SUMMARY OF DATA ON FINAL CLASSIFYING TEST

Scores	Grade IV f
45 - 49	12
40 - 44	29
35 - 39	24
30 - 34	22
25 - 29	6
20 - 24	5
15 - 19	1
10 - 14	1
Total Population	100
Mean	36.75
SD	6.90

TABLE IX

SUMMARY OF DATA ON FINAL INDEXING TEST

Scores	Grade IV f
40 - 44	8
35 - 39	26
30 - 34	34
25 - 29	13
20 - 24	12
15 - 19	5
10 - 14	2
Total Population	100
Mean	31.10
SD	5.10

TABLE X

SUMMARY OF RELATIONSHIPS: BACKGROUND OF INFORMATION, CLASSIFYING, INDEXING, AND INTELLIGENCE

(100 Fourth-Grade Subjects)

Instruments	r	S. E. of r
Inventory on Background of Information with Classifying Test	.77	±.041
Inventory on Background of Information with Indexing Test	.75	±.044
Inventory on Background of Information with Binet	.71	±.049
Classifying Test with Binet	.90	±.020
Indexing Test with Binet	.89	±.020
Classifying Test with Indexing Test	.93	±.013

(1) scores on classifying test and (2) analysis of items.

Scores on Classifying Test. —The frequency distributions, with means and standard deviations for grades three, four, and five are presented in Table III.

The findings indicate that the 56 items in the Classifying Test were discriminating among the abilities of pupils in three grades.

Analysis of Items. —The statistical technique used to determine significance of items for the test on classifying was the standard error of the difference between proportions.

A summary of the data on item analysis for the Classifying Tests for grades three and four is presented in Table IV.

The findings on the significance of items at the 5 or 1 percent level of confidence were: (1) third grade subjects, 79 percent; (2) fourth grade subjects, 53 percent; and (3) combined data for third and fourth grade subjects, 98 percent.

Experimental Test on Indexing Ideas

The data from the experimental test on indexing ideas will be presented in two categories: (1) scores on classifying tests, and (2) analysis of items.

Scores on Indexing Test. —The frequency distributions, with means and standard deviations for grades three, four, and five are presented in Table V. The findings indicate that the 56 items in the Indexing Tests were discriminating in difficulty among the three grade levels.

Analysis of Items. —The statistical technique used to determine significance of items for the Indexing Test was the standard error of the difference between proportions.

A summary of the data on item analysis for the Indexing Test for grades three and four is presented in Table VI.

The findings on the significance of items at the 5 or 1 percent level of confidence were: (1) third grade subjects, 52 percent; (2) fourth grade subjects, 66 percent; and (3) combined data for third and fourth grade subjects, 98 percent.

Results of Tests Employed in the Final Survey

In the final survey, the three instruments constructed for this investigation were administered to a fourth grade population. The results of the Stanford-Binet Test of Intelligence, Form L, 1937 Revision, that was administered to the subjects during their first year of school are reported last. Final Inventory on Background of Information was so constructed that fourth grade pupils would answer all items at 88 to 100 percent. A summary of the data on the final Inventory taken by the 100 subjects participating in the actual survey is reported in Table VII.

Final Test on Classifying Ideas

Data concerning the Classifying Test administered to the 100 fourth grade subjects participating in the survey are presented in Table VIII. The frequency distribution of the scores obtained on the fifty items, with the mean and standard deviation, are reported.

Final Test on Indexing Ideas

Data concerning the indexing test administered to the 100 fourth grade subjects participating in the final survey are presented in Table IX. The frequency distribution of scores obtained on the fifty items, with the mean and standard deviation are included in Table IX.

Stanford-Binet Test

The Stanford-Binet Test of Intelligence, Form L, 1937 Revision, had been administered to all fourth grade subjects during their first year of school. The intelligence quotient range was from 72 to 151. The mean and standard deviation were:

1. Mean	113.05
2. Standard deviation	11.62

Relationships Among Abilities

The findings from the instruments administered to the 100 fourth grade subjects participating in the final survey were used to determine relationships that exist among various abilities:

1. Relationship between comprehension of verbal abstractions and background of information.
2. Relationship between comprehension of verbal intelligence and intelligence.
3. Relationship between abilities to classify and index ideas.

The Pearson Products Formula was employed. A summary of relationships is presented in Table X.

CONCLUSIONS

Within the limitations of this study, the following conclusions appear to be valid:

1. There is a high, positive relationship between the comprehension of verbal abstractions and background of information.
   a. There is a high, positive relationship between ability to classify ideas and background of information.
   b. There is a high, positive relationship between ability to index ideas and background of information.

c. The relationship between indexing ability and background of information is slightly lower than the ability to classify ideas and background of information.

2. There is a very high, positive relationship between the comprehension of verbal abstractions and intelligence.
   a. There is a very high, positive relationship between ability to classify ideas and intelligence.
   b. There is a very high, positive relationship between ability to index ideas and intelligence.
   c. The relationship between indexing ability and intelligence is slightly lower than the ability to classify ideas and intelligence.

3. There is a very high, positive relationship between ability to classify and index ideas.

IMPLICATIONS FOR PRESENT PRACTICES

This study appears to have certain implications for teachers in their guidance of comprehension of concepts at different levels of complexity.

1. Comprehension of concepts of science found in primary reading materials tends to be lacking in young children. More emphasis should be placed on developing concepts that appear in primary science materials.

2. Comprehension of concepts is greater with pupils of superior intelligence than with those of average or low intelligence. To enhance conceptual comprehension for the average or "slow" learner, provision should be made to develop a background of experience for concepts found in instructional materials. This may be achieved by providing experiences ranging from direct to vicarious ones.

3. Greater emphasis appears to have been on an inductive rather than deductive approach to comprehension of concepts at different levels of complexity. For increased comprehension of concepts, deductive as well as inductive instruction should be provided.

SUGGESTIONS FOR FURTHER STUDY

1. Similar studies should be conducted at various grade levels. Further research could establish the relationship between the comprehension of verbal abstractions and intelligence.

2. Several studies of this type should be conducted at the college level to determine classifying and indexing ability of more mature students. This would be an additional index to the comprehension of concepts found in materials at the college level.

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A STATISTICAL ANALYSIS OF CERTAIN EDUCATIONAL VIEWPOINTS HELD BY TEACHERS*

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EDUCATIONAL VIEWPOINTS quite reasonably are presumed to be important factors in determining what shall be taught in the school and how it shall be taught.

The composite of educational viewpoints, or educational philosophy, accepted by the superintendent of schools and his administrative staff (presumably with the approval of the school board and, in turn, reflecting the sentiment of the community) and applied with the cooperation of the teaching corps, determines the objectives of teaching to which the school system is committed. It is expected that individual teachers will conduct their classes in keeping with indicated objectives.

Of course, the educational viewpoints, or philosophy, of individual teachers may or may not conform to those of the school system in which the teacher is employed. Furthermore, because of lack of real understanding of the implications of the viewpoint held, or inability to translate the viewpoints into classroom behavior, or perhaps external pressure to the contrary, a teacher may not conduct his classes in keeping with the viewpoints he holds about educational matters. Nevertheless, in terms of probable inference, we would expect teachers committed to certain educational philosophies to behave differently in specified school situations than teachers committed to other educational viewpoints.

With such a postulate in mind—that teachers' educational viewpoints are reflected in their classroom behaviors—the present study was undertaken in an attempt to better understand the organization of teachers' educational viewpoints. Analyses were made to determine how certain viewpoints of teachers might be intercorrelated and the extent to which such viewpoints might be developed around some central core, or, on the other hand, might be characterized by multi-dimensionality.

Hypothesis

It was hypothesized that the educational viewpoints of teachers tend to be organized into several relatively independent clusters with respect to academic achievement standards, curricular organization, pupil participation in class planning, and similar matters—that a teacher's viewpoints with regard to certain significant educational practices may bear little or no relation to his viewpoints regarding other significant practices.

Procedures

To test this hypothesis: (1) two forms of an Educational Viewpoints Inquiry were constructed and administered respectively to elementary and secondary teachers enrolled in summer session classes in geographically scattered colleges of teacher education; (2) responses to the Educational Viewpoints Inquiry were tabulated and tetrachoric intercorrelation coefficients computed between the items of each form (elementary form and secondary form); and (3) each of the two resulting correlation matrices (one based on the responses of elementary teachers and the other based on the responses of secondary teachers) was factor analyzed.

The instrument employed for sampling educational viewpoints, the Educational Viewpoints Inquiry, was a short form made up of 20 items, each item forcing a choice between contrasting viewpoints regarding educational practices. The form of the Educational Viewpoints Inquiry employed with elementary school teachers is shown in Figure 1.

As may be noted from Figure 1, items included in the Inquiry were devised to sample viewpoints with respect to: (1) curricular organiza-

*The analysis reported was carried out as one of a number of researches conducted in connection with the Teacher Characteristics Study. The Teacher Characteristics Study is a project of the Grant Foundation and the American Council on Education. Central offices of the project are located at the University of California at Los Angeles.

Figure 1

EDUCATIONAL VIEWPOINTS INQUIRY
(Elem.)

(Spec. 6-1-50)

Give your reaction to each of the following questions by marking an X in the box beside the response that most closely corresponds to your viewpoint.

1. In your class do you prefer to have a penmanship period.

   ( ) separate from the language expression period?
   ( ) combined with the language expression period?

2. Do you believe that parent groups should

   ( ) participate in planning the school program?
   ( ) be well informed regarding the school policies, but not encouraged to participate directly in the program?

3. In planning units of classwork do you believe that

   ( ) this should be largely the responsibility of the teacher?
   ( ) the suggestions should come principally from the children in the class?

4. In your class do you believe it is better to have

   ( ) most of the reading content related to the language expression unit?
   ( ) the reading work and the language expression work largely separate?

5. In your class do you believe it is better

   ( ) to have several activities going on at once?
   ( ) generally to have one activity in progress at a time?

6. In planning the social studies content for your class do you believe

   ( ) the content should be prescribed and relatively closely followed?
   ( ) considerable variation should be allowed in planning the content?

7. Is the average third grade child capable of "self-control" in the sense in which we usually use the term in referring to older persons?

   ( ) Yes
   ( ) No

8. In your class do you think it is better to have

   ( ) the number work and the social studies work set up in relatively distinct units?
   ( ) the number work closely related to the social studies unit?

9. Do you feel it is possible to develop most classwork around "out of school" activities?

   ( ) Yes
   ( ) No

10. In your class do you believe the pupils learn to read more effectively in

( ) a single unified group?
( ) several smaller reading groups?

11. In the third and fourth grades do you think it is preferable to have

( ) special teachers for all art and music instruction?
( ) art and music taught exclusively by the regular classroom teacher?

12. If it were necessary to use a minimum school day for your class and you were free to plan the activities, do you believe it would be better

( ) to keep approximately the regularly allotted time for reading and number work, limiting somewhat the time for social studies?
( ) to keep approximately the regularly allotted time for social studies, limiting somewhat the time for reading and number work?

13. Do you believe that parents should be permitted to visit classroom during regular class hours?

( ) Yes
( ) No

14. Do you feel that effective control of pupils in class can be achieved by making the class itself completely responsible for such controls?

( ) Yes
( ) No

15. If it were necessary to use a minimum school day and you were free to plan the activities, do you believe it would be better

( ) to keep approximately the regularly allotted time for reading and number work, limiting somewhat the time for art and music?
( ) to keep approximately the regularly allotted time for art and music, limiting somewhat the time for reading and number work?

16. Do you believe that you should have considerable freedom to modify courses of study or units of work from class to class?

( ) Yes
( ) No

17. At the third and fourth grade levels do you believe

( ) it is important to set and require relatively high standards of pupil achievement in the subjects taught?
( ) academic achievement is relatively unimportant as compared with other objectives?

18. Do you feel that classroom responsibilities and administrative responsibilities

( ) are fairly distinct and should be clearly defined and separated in the most effective school program?
( ) overlap and should be participated in by all personnel regardless of particular assignments?

19. In the third grade do you believe that <u>home study</u> supplementing and complementing classwork

( ) is generally desirable?
( ) is generally undesirable?

20. Do you believe that third grade children should

( ) be required to meet prescribed academic standards before beginning the work of the fourth grade?
( ) not be required to meet minimum standards of academic achievement before beginning fourth grade work?

TABLE I

MATRIX OF TETRACHORIC CORRELATION COEFFICIENTS (ELEMENTARY TEACHERS)
N = 213

	2	3	6	7	8	9	10	13	14	15	16	17	18	19	20
2		-20	05	32	-28	27	-04	56	08	-44	03	-41	-28	-31	-31
3			28	-01	50	-35	29	-02	-22	14	03	22	12	18	-02
6				-23	02	-16	17	-19	-32	10	..	46	38	41	17
7					-06	13	12	16	08	-41	28	07	11	-09	-04
8						-32	-05	-28	-04	23	-27	27	18	09	13
9							15	15	30	-36	54	-28	-24	-04	-31
10								19	13	-03	14	-14	09	35	20
13									22	-16	75	-22	-14	-05	-08
14										-30	29	-14	-12	-27	-18
15											..	48	24	30	15
16												-38	-50	-19	-60
17													38	35	56
18														24	49
19															26
20															

TABLE II

CENTROID FACTOR MATRIX (ELEMENTARY TEACHER SAMPLE)

	I	II	III	IV	V	VI	h^2
2	-63	14	22	-10	34	-10	60
3	51	-39	18	19	39	-10	64
5	-59	09	06	-20	08	22	45
7	-20	27	42	27	15	-16	41
8	49	-36	33	16	05	17	54
9	-53	14	-23	35	-10	07	49
14	-35	-08	10	22	-35	11	32
17	63	30	18	15	-09	16	58
18	49	31	18	07	-11	-17	41
19	47	28	-34	21	22	16	53
20	58	49	17	-23	-30	04	75

TABLE III

ROTATED PRIMARY FACTOR MATRIX—OBLIQUE SOLUTION
(ELEMENTARY TEACHERS)

	I	II	III	IV	V	VI
2	-12	43	-30	-10	20	01
3	-17	09	67	02	18	-02
5	-10	18	-39	-02	08	27
7	18	57	00	03	-05	-11
8	-06	06	64	-02	-05	24
9	-12	15	-29	31	-34	-04
14	-16	05	00	-02	-48	06
17	57	13	14	22	05	12
18	47	09	08	-01	04	-17
19	37	02	-06	54	23	00
20	73	-06	-18	-07	14	02

tion and scope: (2) pupil participation in class planning; (3) academic achievement standards; (4) teacher-administrative responsibilities; (5) parent participation in the educational program; and (6) class, or course, planning and procedure.

A number of item rationales, or hypotheses, were developed in each major category and materials were selected for apparent representativeness and significance. The items went through a number of revisions, based upon the experiences of respondents in pilot studies, until the phrasing and content seemed to conform to the purposes of the instruments.

Each item in the elementary form of the Educational Viewpoints Inquiry had its approximate counterpart in the form employed for use with teachers of secondary school subjects.

In the minds of the staff of the Teacher Characteristics Study the Educational Viewpoints Inquiry possessed satisfactory logical validity. No means were available to test the instrument empirically; at least, not in any direct manner. Item analyses against somewhat removed external criteria related to certain aspects of teacher and pupil behavior i. e., pupil behavior in a teacher's class, systematic and responsible classroom behavior on the part of the teacher, sympathetic-understanding behavior of a teacher, etc., were carried out for other purposes and most, but not all, of the items differentiated significantly between criterion groups formed on the basis of classroom observation. For the purpose of the present study such results (the correlation of responses to the Educational Viewpoints Inquiry with other criteria of teacher behavior) may be considered interesting but not of vital importance. The teachers' anonymous expression of a viewpoint, when that expression is subject to no external pressure, is probably as valid an indication of what the teacher believes as can be obtained.

In addition to the sampling of educational viewpoints, the Educational Viewpoints Inquiry included a number of "information," or "identification," type items relative to the respondent's sex, extent of teaching experience, extent of training, and the like. Such items provided control data.

The respondents contributing to this analysis did not write their name on the Educational Viewpoints Inquiry or identify themselves in any way.

The Educational Viewpoints Inquiry, in its two similar forms adapted for elementary and secondary teachers, was completed by samples consisting of 213 elementary school teachers and 338 secondary school teachers during the summer of 1950. The respondents were enrolled in the summer sessions at ten teacher education institutions in nine states ranging from California to Pennsylvania and Michigan to Florida. Eight of the teacher education institutions were public universities, one was a state college, and one was a private university. The responses of both experienced teachers and teachers-in-training were obtained. The ratio of experienced to inexperienced teachers in the samples employed was approximately 2 to 1.

Upon receipt of the completed Inquiries, 2×2 tables were set up for cross tabulation of the responses and tetrachoric correlation coefficients were computed between each item and every other item of the Inquiry. This procedure was duplicated for the elementary teacher sample and the secondary teacher sample.

Prior to the undertaking of factor analyses, the items and intercorrelations were reviewed and some eliminated due to disaproportionate acceptance of one response over the alternative response. (For example, 330 of the 338 secondary school teacher respondents answered "yes" to the question: "Do you believe a high school instructor should have considerable freedom to modify courses of study or units of work from class to class?" With such a split of responses, no meaningful relationship between this item and other items could be established.) Following this step, still other items were eliminated from the correlation matrices in order to maintain better numerical balance between the groups of items (i. e., curricular organization and scope, academic achievement standards, etc.,) and perhaps avoid artifacts in the factor analysis due to disproportionate representation of certain of the areas or groups of items.

Eleven variables, then, (items 2, 3, 5, 7, 8, 9, 14, 17, 18, 19, and 20) were included in the elementary correlation table, and 14 variables (items 1, 2, 3, 5, 7, 9, 10, 11, 12, 14, 17, 18, 19, and 20) made up the correlation table for the secondary form of the Educational Viewpoints Inquiry.

Factor analyses were accomplished by the centroid method described by Thurstone.

Results

Elementary Teacher Form of Educational Viewpoints Inquiry. —The intercorrelations between responses of elementary teachers to the Educational Viewpoints Inquiry covered a wide range, from 0. 01 to 0. 56. Six centroid factors were extracted and subsequently rotated to oblique simple structure.

The first factor seemed fairly clearly to have to do with emphasis upon the academic functions of the teacher—belief, perhaps, in the importance of the "fundamentals." Factor 3 also seemed to reflect a so-called "traditional" subject-matter curricular emphasis. Factors 1 and 3 were correlated to the extent of 0. 44.

Factor 2 had only two significant loadings. It

TABLE IV

TRANSFORMATION MATRIX (ELEMENTARY TEACHER SAMPLE)

	I	II	III	IV	V	VI
I	39	-22	42	08	21	-01
II	89	41	-74	34	24	-10
III	17	60	36	-40	-05	26
IV	-06	43	38	60	-58	-22
V	-07	47	06	31	75	10
VI	16	12	-10	51	03	93

TABLE V

CORRELATIONS BETWEEN PRIMARY FACTORS (ELEMENTARY TEACHER SAMPLE)

	I	II	III	IV	V	VI
I	100					
II	- 31	100				
III	44	- 22	100			
IV	- 13	- 28	13	100		
V	- 13	- 09	21	13	100	
VI	00	- 06	- 08	- 21	- 20	100

TABLE VI

MATRIX OF TETRACHORIC CORRELATION COEFFICIENTS (SECONDARY TEACHERS)
N = 338

	1	2	3	5	7	9	10	11	12	14	17	18	19	20
1		18	-16	15	10	29	-16	-38	-13	18	-27	-19	-07	-25
2			-18	34	09	34	-19	-32	-09	30	-32	-26	-22	-24
3				-42	-13	-08	24	36	22	-42	20	22	18	22
5					06	28	-37	-41	-12	32	-24	-18	-27	-07
7						-13	02	-37	-10	16	-07	-18	-03	-10
9							-20	-29	-07	39	-14	-10	-02	-22
10								36	13	-14	18	05	-14	21
11									25	-13	51	39	07	61
12										-18	27	-03	25	39
14											-05	-08	-15	-17
17												38	27	68
18													12	38
19														21
20														

TABLE VII

CENTROID FACTOR MATRIX (SECONDARY TEACHER SAMPLE)

	I	II	III	IV	V	VI	h^2
1	-41	-05	21	07	-08	-11	24
2	-51	15	15	14	-08	25	39
3	52	-17	14	21	-26	03	43
5	-57	40	-17	-22	-05	24	62
7	-24	-20	26	-30	33	-03	36
9	-42	32	26	39	-27	-15	59
10	38	-28	16	22	33	27	48
11	79	23	-18	34	18	19	89
12	39	14	33	-17	-22	24	42
14	-48	42	11	19	36	-14	60
17	64	39	20	-09	28	-18	72
18	42	19	-20	11	12	-21	32
19	32	11	21	-24	-23	-38	41
20	67	45	10	-18	14	19	75

TABLE VIII

ROTATED PRIMARY FACTOR MATRIX—OBLIQUE SOLUTION
(SECONDARY TEACHER SAMPLE)

	I	II	III	IV	V	VI
1	-25	27	16	07	06	-12
2	-11	35	26	-04	-11	16
3	-07	00	-15	41	-34	04
5	14	07	17	-58	-06	00
7	-07	-01	45	01	34	03
9	-08	65	-01	11	-11	-15
10	03	-02	16	48	08	51
11	52	-06	-33	23	-12	40
12	24	06	26	10	-42	07
14	25	50	13	-11	42	06
17	68	10	00	07	14	00
18	32	-08	-36	-01	11	-06
19	14	00	-06	-01	-10	-46
20	73	-03	08	-07	-16	19

TABLE IX

TRANSFORMATION MATRIX (SECONDARY TEACHER SAMPLE)

	I	II	III	IV	V	VI
I	39	-26	-24	27	-21	09
II	82	43	-05	-46	-09	-07
III	02	66	73	56	-08	06
IV	-18	55	-38	62	-01	36
V	38	00	26	08	84	48
VI	09	-09	44	-01	-49	79

TABLE X

CORRELATIONS BETWEEN PRIMARY FACTORS (SECONDARY TEACHER SAMPLE)

	I	II	III	IV	V	VI
I	100					
II	- 42	100				
III	08	- 28	100			
IV	57	- 57	12	100		
V	- 15	06	- 01	- 09	100	
VI	- 38	27	- 35	- 47	06	100

appeared to have something to do with the teacher's democratic viewpoints toward parents and pupils and his willingness to recognize the possible contributions of such persons.

Factor 4 had only one significant loading, this having to do with belief in the desirability of home study. (This response also contributed significantly to factor 1. It seems doubtful that factor 4 need be further considered.)

Factor 5 had only two significant loadings and was difficult to identify in terms of its psychological meaning.

Factor 6 appeared to be of no great significance, having no factor loading as high as 0.30.

As has been noted already, the factors extracted were correlated. The correlations between primary factors derived from the matrix transform suggest that while several clusters of viewpoints are statistically isolable, the most significant data relative to an individual teacher may be a single evaluation based upon such items as numbers 17, 18, 20, 3, 5 (negatively considered), and 8, the cluster apparently having to do with viewpoints accepting or rejecting subject-matter centered teaching and emphasis upon standards of achievement. Tables I through V show respectively the correlation matrix, the centroid factor matrix, the rotated primary factor matrix, the transformation matrix, and the correlations between primary factors derived from the transformation matrix, based on the elementary teacher data.

From Table II it will be noted that with very few items is any substantial amount of the variance accounted for by contribution of the item to the several factors extracted. It would seem, therefore, that among the various issues about which elementary teachers form definite views, there is considerable specificity and relatively little tendency for the viewpoints to be systematically interrelated, except perhaps with regard to the matter of academic emphasis.

Secondary Form of the Educational Viewpoints Inquiry

The range in magnitude of the intercorrelations between items comprising the secondary form of the Educational Viewpoints Inquiry was similar to that for the elementary form, the correlation coefficients extending from 0.02 to 0.68.

Again, six centroid factors were extracted and rotated to simple structure. The resulting factors were oblique and were even less well-distinguished from one another than those resulting from the analysis of the elementary form of the Inquiry.

Factor 1 was fairly well-defined and appeared to have to do with subject-matter emphasis and academic standards—similar, it would appear, to factor 1 of the elementary analysis.

Factor 2, stated negatively, seemed to be related to the teacher's belief that most course content must be developed systematically around basic principles or facts rather than around "real life situations." Factor 2 was correlated 0.42 with factor 1.

Factor 4 seemed to be identified with viewpoints that embrace singleness of purpose and "taut" teacher control of the learning situation. This factor is related to factor 1 and also to factor 2, correlations derived from the transformation matrix being 0.57 in each case.

Factor 6 is closely related to factor 1 and 4, there being a sharing of significant factor loadings with respect to items number 10 and 11. If the factor loadings of items 10 and 11 are disregarded, this factor might be described in negative terms as having to do with approval of homework for high school students. Factor 6 is correlated 0.38, 0.27, and 0.47 respectively with factors 1, 2, and 4.

Factor 3 is not clearly defined, but appears to be related to willingness to share responsibility and to accept the cooperation of others.

Factor 5 seems to have to do with the teacher's faith in the capabilities of his students and willingness to accept them as individuals.

As in the case of the elementary analysis described above, the intercorrelations between the factors suggest that further combination of the items might reveal more satisfactory bases for individual evaluation than the obtained factor scores. Items 11, 12, 17, 19, 20, 9 (in negative terms), 3, 5 (negative), 10, and perhaps 19, appear to form a somewhat meaningful pattern related to subject-matter centered teaching and emphasis upon standards of achievement.

A second cluster of viewpoints, perhaps of minor importance, may be identified with factor 5.

Tables VI through X present the basic results showing respectively for the secondary teacher sample the matrix of correlation coefficient, the centroid factor matrix, the rotated primary factor matrix, the transformation matrix, and correlations between the primary factors derived from the transformation matrix.

Conclusions

In general, it appears that the results of the factor analyses of elementary teacher and secondary teacher responses to the Educational Viewpoints Inquiry support the hypothesis that teachers' educational viewpoints are not highly systematized or organized, although it is true that one or two constellations of viewpoints are suggested by the results. However, the relatively large amount of item variance that could not be accounted for in terms of group factors indicates considerable specificity on the part of the items

making up the Educational Viewpoints Inquiry. A composite score based upon responses to the Inquiry might reasonably be employed to indicate the general tendency of the teacher to associate himself with so-called "modern" educational viewpoints as contrasted with viewpoints that sometimes have been called "traditional." Such a score might even have use in attempting to place teachers in school systems with educational philosophies more or less similar to those held by individual teachers. But the results of the factor analyses presented here suggest that the viewpoints contributing to such a total score are fairly heterogeneous and tend not to be highly intercorrelated.

CURRICULUM FOR PRIMARY TEACHERS*

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Introduction

REALIZING THAT the personality and professional background of the primary teachers are important considerations, that there is need for healthy, vigorous teachers with friendly, cheerful personalities who have a sense of humor, who like children and who are liked by them, that there is need for well-groomed, intelligent, professionally minded ladies who are not only informed in their special field but see it in the total educational picture and interpret it to others, and that there is need for alert teachers who, knowing modern trends, are able to work with parents and community for the best welfare of the child, —the student branch of the Association for Childhood Education at Southern Illinois University has made a study of nursery-primary curriculum.

Statement of the Problem

The three fields in which this research is conducted are: (1) What is the Felt Need of the Teachers Themselves; (2) What are the Requirements for Certification; and (3) What is Being Offered in the Colleges and Universities. This last part is being omitted inasmuch as it seems impossible to obtain an accurate summary because of the diversity of titles and variety of ways in which the courses are written up.

Procedure

1. What is the Felt Need of the Teachers Themselves?

The discovery of the felt need of the teachers proceeded in two steps. First, a study was made of the teachers of Southern Illinois who are working in the field, and second, taking a representative group of these teachers, a study was made of their activities from the time they awoke on Monday morning to the time they went to bed on Sunday evening.

In order to gain a picture of the primary teacher in Southern Illinois, information on three items was needed: (a) Are they single or married? (b) Do they have dependents? (c) Do they live in a room, an apartment, a home, or with parents? This study is made of four hundred twenty primary teachers, nursery, kindergarten, first, second, and third grade. Inasmuch as southern Illinois has no large industrial section, the four hundred-twenty primary teachers in the towns and villages around Southern Illinois University well represent the total number of primary teachers of all southern Illinois.

Are They Single or Married? —Of the four hundred twenty primary teachers, two percent are nursery teachers, 11 percent are kindergarten, 31 percent are first grade, 30 percent are second grade, and 26 percent are third grade. They all teach in the public schools with the exception of the nursery teachers.

All of the nursery teachers in this group are married. (It should be noted that the nursery schools are private.) There are 50 percent or half of both the kindergarten and the first grade teachers who are married, and 54 percent or more than half of the third grade teachers are married. Only in the second grade did we find fewer than half or 41 percent of the teachers married. Thus a program planned to meet the needs of the single teacher will not meet the needs of half the group.

These figures emphasize the fact that to plan a curriculum to meet the needs of the primary teacher, we must plan for the married woman. More than that, we must provide refresher courses for those who, having been out of school a number of years, need to become acquainted with the best in methods.

Do They Have Dependents? —The dependents listed in order of frequency are: children, mother, father, both parents, and invalid husband. Where both the wife and husband are working, the husband is not considered a dependent.

Fifty-eight percent of the four hundred twenty primary teachers are supporting or helping their husbands in the support of one or more individuals besides themselves.

Those who plan a primary curriculum to meet the needs of the primary teacher must take into account the fact that more than half of these girls will be either supporting or helping to support one or more individuals besides themselves.

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Where Do They Live? —Only six percent of

* A study made possible by a Research Grant from Southern Illinois University.

these teachers come from one room, and only five percent come from the parental home. It would be of interest to learn how many of these are aiding in the support of the parental home. Only nine percent come from apartments. (Remember the study is made of teachers in southern Illinois where there are no large industrial areas.) By far the largest number, 80 percent, come stepping out of homes with market baskets on their arms. The traditional book bag has disappeared.

The second step became that of determining how these primary teachers are able to be wives, mothers, daughters and housekeepers, besides teaching school for eight hours a day. In order to determine this, 37 kept a record of what they did each half-hour from the time they got up on Monday morning until they retired on Sunday night. This was done for one week by each of the 37 primary teachers. These 37 teachers were selected so that they represented the 420: four live with parents at home, two in rooms, four in small apartments, and 27 in their own homes. Looking at the group another way, five take care of one or both parents; six live alone (of which one contributes to the support of a son in college and another a parent in a sister's home); nine live in homes where the husband is absent (in the army, divorced, or dead); and 17 live with husband and family. The 37 are a cross section of the 420 primary teachers in southern Illinois. Each teacher recorded at half-hour intervals the activities in which she was engaged. The information from each of the 37, for the seven days, was then combined. The data for Monday is in the Monday Time Schedule at the end of this article.

For the sake of space and clarity, the number doing each activity is not recorded here. Also it will be noted that often an activity carried over several half-hour periods.

The morning activities which have been recorded on the time schedules for the five days are much the same. They vary most in the ones for whom the primary teacher cares for before school: the baby, children, invalid mother, father, or husband; and in school: nursery, kindergarten, first, second and third grade. It is the time after school which varies more from teacher to teacher and from day to day. As the Monday schedule shows, Monday evening is largely spent in the home. Tuesday afternoon activities within the school building include faculty meetings and conferences with parents or principal; while for the evening such activities as Sunday School parties, missionary meetings, Business and Professional Women's Club, American Association of University Women, Rebecca Lodge, Association for Childhood Education, Extension class, kindergarten club, and primary teachers' club are listed. Wednesday follows the Monday pattern in that it is largely a home night. In the evening there are a few more church activities listed. The activity which characterizes Thursday as apart from Monday is cleaning the cupboards, the kitchen, or the bathroom instead of the laundry or the ironing. The Thursday evening list includes: study for extension, reading, listening to the radio, playing cards or visiting. The morning activities for Friday may lock step with the other four days but recreation characterizes the activities from two o'clock in the afternoon through the evening. In school may be found Recreational Music, Story Hour, Industrial Art, Household Arts, and Free Activities. Among the evening activities may be found dinner out, movies, games with the children, beauty parlor, theater, card party with friends, and television with invited guests.

It will be noted upon studying the Saturday Schedule that many of the activities which the general housewife does during the first six days of the week are crowded into Saturday. In order to do this, the housewife-teacher must be an expert in household management. She must be an efficient worker and a careful planner.

With the stress of the week's school and household work behind them, these housewife-teachers (note Sunday Schedule) on Sunday become housewives resting an hour longer before arising. But once up they carry through in the usual efficient manner, for Sunday finds 90 percent of these married and single teachers attending either Sunday school or church or both. Twenty percent of these work in some capacity as Sunday school teacher, organist, pianist, helper in young people's activities, or choir member. Planning for the whole of the primary teacher, Sunday worship and morning devotions, as well as recreation, should be considered.

These data which were recorded every half-hour from the time the primary teacher got up in the morning on Monday until she retired Sunday evening may be summarized as follows:

I. Personal
   1. Personal hygiene: soap, cosmetics, tooth paste, shampoo, home permanents
   2. Recreational:
      a. Reading (The group did not list what they read.)
      b. Music: organ, piano, voice
      c. Radio, television
      d. Movies, Theater
      e. Games: with children, cards with adults
      f. Correspondence
      g. Clubs: American Association of University Women, American Legion Auxiliary, Association for Childhood Education, Business and Professional Women, Rebecca Lodge, etc.
   3. Religious: daily devotion, church, Sunday

TABLE I

NURSERY-PRIMARY CURRICULUM

Certification Requirements Listed as Subjects	"Felt Needs" Listed as Content	Semester Hours
	General Education	
Art and Music		4-6
Music appreciation, piano voice	Simple melodies, rhythmic activities	
Art	Knowledge and appreciation of old and new masters, design, sketching, painting, weaving (emphasis on creative art)	
Industrial Art	Knowledge of tools, wood, metal, clay, leather	
English		9-15
Written	Letters, articles (magazines, papers), radio scripts, stories, grammar, poetry	
Oral	Reports, story telling, choral reading, round table discussion, parliamentary rules, usage	
World Literature	Essay, poetry, novel	
Modern Literature	Essay, poetry, novel, knowledge of magazines (professional, literary)	
Children's Literature	Stories, poetry, knowledge of magazines	
Health and Physical Education		5-8
Body Health	Hygiene of home, personal health, first aid, good grooming, morning inspection	
Physical Education	Gymnastics, callisthenics, dancing	
Adult Games	Basketball, soft and volley ball, square dancing, tennis, bowling, cards, checkers	
Children's Games	Rhythm games, outdoor games, indoor games	
Human Development		18-30
History	Human race, national, state, province	
Government	Group control, school room, national	
Sociology	Family, neighborhoods, employment, race prejudice	
Psychology	Mental abilities, laws of learning, retention, mental hygiene, etc.	
Science		12-20
Agriculture	Gardens, pet husbandry, room plants	
Botany, Biology	Aquariums, herbariums, plants, flowers birds, insects	
Chemistry	Acids, alkalies, cosmetics, toilet articles, soaps, cleaning compounds	
Household	Management, meal planning, marketing, sewing, laundry, cleaning	
Physics	Heating and plumbing systems, electric appliances, lighting	
Mathematics	Budgeting, taxes, insurance	
Religion	Daily devotions, Old Testaments, New Testament	

TABLE I (Continued)

Certification Requirements Listed as Subjects	"Felt Needs" Listed as Content	Semester Hours
	Professional Education	
Human Growth and Development		4-8
Child Development	Family group, parental care, behavior patterns in physical, mental, social and moral development (birth to 3 years)	
Child Psychology	Behavior patterns in physical, mental, social, and moral development (3 to 11 years), guidance	
Teaching, Learning Techniques		7-18
Reading	Experience charts, oral, thought, problems, phonics, vocabulary, printing, writing, book building	
Arithmetic	Development of concepts, printing, drill, experience centered, practical use	
Social Studies	Agencies, institutions, leadership, cooperation	
Science	Aquariums, herbariums, excursions	
Public Education	History of education, philosophy, school law, faculty meetings, professional organizations	2-3
Student Teaching	Nursery-primary level, participation: guided and full responsibility	5-10
Electives		

school, Young People's Meetings, Women's Missionary, Choir, Guild, Sunshine Club, etc.

II. Semi-Vocational
1. Marketing: food, clothing, furniture, etc.
2. Household Management
   a. Laundering, washing, ironing
   b. Cleaning: vacuuming, scrubbing, dusting, etc.
   c. Meal planning and cooking: breakfast lunch, dinner, supper, school lunches and teas.
   d. Sewing, mending, embroidering, crocheting, etc.
   e. Caring for heating and plumbing systems

III. Vocational
1. Science: natural, social, physics, psychology (general and child)
2. Art: music, fine and industrial arts
3. English: literature, grammar, usage, journalism
4. Physical Education: Games, playground supervision
5. Arithmetic: primary (nursery to third grade), budgeting, taxes
6. Advanced Study Classes: correspondence, Extension, music
7. Professional Organizations: faculty meetings, Primary Teachers Club, Kindergarten Club, Association for Childhood Education

2. What are the Requirements for Certification?

The first step in this second part was that of writing to each of the forty-eight State Superintendents of Public Instruction for their certification requirements. Where a state does not have the primary certification requirements the one for elementary teachers was sent and is used in this study.

The certification requirements, as set forth by the states, are tabulated and a curriculum containing those items which the majority include is constructed. The underscored curriculum recorded in Table I is the summary of these findings.

Summary

The Student Branch of the Association for Childhood Education at Southern Illinois University then made the summary of the certification requirements into a frame. Into this frame they have written the "felt needs of the primary teacher". This is found on the right in Table I.

This summary sheet was then checked by 80 summer school students—primary teachers who came for summer school—at Southern Illinois University in the Primary Methods Classes. It is their decision that IF such courses as chemistry, physics and mathematics will be reconstructed to meet the "felt needs of the primary teacher" it is alright to include them, but as they now stand in many colleges and universities they should be omitted and new courses constructed which will be of value to the housewife-teacher.

MONDAY SCHEDULE
A. M.

5:00	Arise and partly dress
5:30	Fix breakfast and listen to radio
6:00	Turn on radio for news
	Morning hymns
	Arise and prepare breakfast
	Eat and listen to news
	Dress and start breakfast
	Up and prepare breakfast for six
	Up and turn on heat
6:30	Read Bible
	Prepare breakfast
	Pack three lunches
	Up and straighten house
	Up and dress
	Start coffee and read paper
	Eat and straighten room
7:00	Eat breakfast
	Dress and prepare for school
	Feed dog and walk him
	Dress and feed baby
	Take daughter to University
	Prepare children's lunches
	Lay out clothing for children
7:30	Dress for school
	Start for school
	Breakfast
	Drive two miles for nurse
	Wash dishes and make beds
	Iron a blouse
	Straighten house
	Dress and make beds
	Take husband to work
	Leave for school
8:00	Build fires at school
	Clean out furnace at school
	Dust and arrange room
	Prepare materials
	Drive three miles to school
	Finish dressing
	Preparation and inspection
	Take baby to mother
	Get the maid, go to school
8:30	Prepare work for day
	Greet children, prepare work
	Supervise play
	Check workbooks
	Sell candy
	Supervise free play
	Wash Sue's face and comb hair
8:30	Wash Johnny's feet and give him sox
	Send sick to nurse
	Inspect and sew button on child's dress
	Inspect and call parents
9:00	Opening exercises
	Inspection and call parents
	Inspection and order milk
	Music
	Reading, workbooks
	Reading and drill
	Reading and phonics
	Excursion
9:30	Arithmetic and drill
	Excursion
	Arithmetic and science
	Science and art
	Demonstration lesson
	Industrial art and numbers
	Reading experience chart
	Music
10:00	Numbers and recess
	Recess and health
	P. E. and Reading
	P. E. and science
	Recess and letter writing
	Recess and printing
	Morning lunch and rest
10:30	Numbers and music
	Art and science
	Lunch and rest
	Recess and science
	Recess and milk
	Excursion
	Numbers and art
	Rest and numbers
	Recess and music
11:00	Numbers and story
	Rest and numbers
	Science
	Excursion
	Experience chart
	Industrial art
	Art and numbers
11:30	Numbers and science
	Industrial art
	Music and numbers
	Numbers and lunch
	Preparation for home
	Clean up room and lunch
	Industrial art and clean up

MONDAY SCHEDULE
P. M.

12:00	Lunch
	Prepare and eat lunch
	Home and lunch
	Shop and lunch
	Supervise lunch
12:30	Lunch
	Supervise play
	Prepare for P. M. classes
1:00	Reading
	Story
	Inspection and send to nurse
	Music and story
	Number work and drill
	Phonics and number
	Science and P. E.
	Resting and story
	Art and reading
1:30	Industrial art
	Story and dramatization
	Music and dancing
	Art and music
	Science and art
	Excursion
	Printing and writing
	Writing and art
2:00	Rest and lunch
	Rest and art
	Rest and music
	Free play
	Science
	Recess and art
	Excursion
2:30	Rest and lunch
	Recess and art
	Recess and music
	Rest and art
	Science and P. E.
	Drill and music
	Prepare for home
	Clean up and leave
3:00	Science
	Work period
	Industrial art
	Clean up room
	Prepare for next day
	Spelling and writing
	Close school
	Conference with parent
	Conference with principal
	Prepare for next day and leave
3:30	Industrial art and spelling
	Spelling and music
	Preparation of room for next day
	Cleaning and leaving
	Conference
	Social studies
	Leave to shop
4:00	Run errands, pay bills
	Postoffice
	Groceries
	Play with baby
	Get child from mother's
	Rest
	Start supper
	Feed father
4:30	Prepare room
	Clean and fix furnace
	Sweep and prepare for next day
	Gather children and go home
	Janitor work
	Kindergarten teachers' meeting
	Faculty conference
	Go to postoffice
	Shop and go home
5:00	Prepare supper and wash dishes
	Put away groceries and wash dishes
	Get groceries
5:30	Eat
	Prepare supper
	Wash dishes
	Straighten house
	Groceries
6:00	Supper
	Prepare supper
	Wash dishes
	Feed baby and eat
	Feed and walk dog
6:30	Take nurse home
	Eat and wash dishes
	Start laundry in basement
	Play with baby
	Help children with school work
7:00	Give small son bath
	Study for extension
	School work
	Sell tickets at school
	Sell candy at school game
	Iron
	Extension

MONDAY SCHEDULE
P. M. cont'd

7:00	Take baby to see grandmother Straighten up house Lay out clothes for next day
7:30	American Legion Auxiliary Lay out clothes for morning Iron Laundry Prepare school work Put away laundry Sell tickets at school Sell candy at school Extension class Help boys with lessons Put baby to bed
8:00	Laundry Prepare school work Extension class American Legion Auxilliary Study for extension Sprinkle clothes Sell tickets at school Sell candy at school Iron Radio, mend, read Lay out baby clothes Help children with bath
8:30	Laundry American Legion Auxilliary Prepare work for school Read paper Sell candy at school Extension class Iron while listening to radio Radio and help children Radio and sew
8:30	Plan meals for the next day Write note for maid Help girls with baths
9:00	Laundry American Legion Auxilliary Prepare for next day school work Extension Read paper and magazines Iron and radio Help girls with bath Prepare son for bed Plan meals Radio and rest
9:30	Finish laundry School work Iron and radio Extension class Prepare for bed
10:00	Take bath and pin up curls Prepare for bed Lay out clothes for family Prepare dress for next day Read and write letters Launder stockings and to bed Watch television
10:30	Pick up around the house Launder stockings, etc. Bath and to bed Read the Bible and to bed Read and write letters To bed and read to sleep
11:00	Retire Bath and to bed

SATURDAY SCHEDULE

A. M.

5:30	Arise and dress	9:00	Laundry, dishes
	Turn on heat		Clean kitchen, defrost refrigerator
			Scrub floor, hang clothes on line
6:00	Start coffee		Shampoo girl's hair, put it up
	Read paper		Shop
	Arise		
	Eat	9:30	Shop
	Go for maid		Change linen, laundry
	Launder		Clean house, radio
			Shampoo girl's hair, pin it up
6:30	Arise and start breakfast		
	Prepare breakfast, radio	10:00	Shop
	Laundry, start coffee		Clean bathroom, watch child
	Eat, Laundry		Clean house, start dinner
			Change linens, radio
7:00	Eat breakfast		
	Dress, put on coffee	10:30	Put groceries away
	Prepare breakfast		Read, rest
	Laundry		Clean house, supervise son's play
	Arise, prepare breakfast		Clean house, start dinner
	Feed baby, dress her		Shopping
			Postoffice
7:30	Wash dishes, launder		Prepare lunch
	Breakfast		
	Change linens	11:00	Prepare lunch
	Launder, prepare breakfast		Clean house, supervise son's play
			Clean house, radio
8:00	Launder, beds		Dress to go to bank
	See that son gets dressed		Service station for gas
	Wash dishes, laundry		
	Wash dishes, laundry linens	11:30	Eat, shop
	Pin up hair		Prepare lunch

P. M.

12:00	Rest	1:30	Plan school work
	Wash dishes		Clean house
	Dinner		Shopping
	Shopping		Visiting
	Prepare lunch		Baking for Sunday
			Take maid home
12:30	Rest		Take girls to movie
	Play outside with baby		Shampoo hair
	Wash dishes		
	Shopping	2:00	Plan school work
	Dinner		Clean house
	Clean house		Shopping
			Visiting
1:00	Plan school work		Baking for Sunday
	Put baby to rest		
	Shopping, visiting	2:30	Bath, dress
	Rehearse vocal lessons		Put away clothes
	Shopping		Shopping, cleaning
	Bath, dress		Baking for Sunday
	Wash windows		Lunch

SATURDAY SCHEDULE
P. M. cont'd

3:00	Shopping with friends	6:30	Dinner out
	Ironing		Dinner, wash dishes
	Visiting		Supper, radio
	Practice on piano and organ		Radio, mend
	Read papers		Read and play with baby
	Clean porch, steps, etc.		Company
3:30	Shopping with friends	7:00	Cards and visiting
	Dress baby and give her juice		Clear table and wash dishes
	Visiting		Iron dresses
	Practice on piano and organ		Study Sunday School lessons
	Ironing		Take baby to grandmother
	Pick up girls and take them home		
	Cleaning	7:30	Cards and visiting
			Play with son and baby
4:00	Shopping with friends		Plan Sunday with husband
	Take baby shopping		Wash dishes, read
	Visiting		
	Practice on piano and organ	8:00	Cards, visiting
	Ironing		Put to bed son, baby, girls
	Bath, dress		Sunday School lessons
			Read paper
4:30	Shopping with friends		Radio, television
	Shopping with baby		
	Visiting	8:30	Entertain
	Practice on piano and organ		Cards, visiting
	Take dog out		Movie, television
	Plan Sunday dinner		Check clothes for Church
	Bathe and dress son		Sunday School lessons
5:00	Dinner out	9:00	Entertain
	Shopping with baby		Cards, visiting
	Visiting		Movie, television
	Dinner		Bathe and go to bed
	Radio and mend		Visit with husband
	Rest, read		Sunday School lesson
	Prepare dinner		
		9:30	Cards, visiting
5:30	Dinner out		Entertain, television
	Dinner, prepare, eat		Movie, radio
	Care for father		Visit with husband
	Radio and mend		Read, go to bed
	Company		
	Prepare supper	10:00	Home reading
			Entertain, movie
6:00	Dinner out		Television, radio
	Dinner		Bathe and go to bed
	Prepare supper		Visit with husband
	Radio, mend		
	Wash dishes	10:30	Bed
	Company		Entertain, radio
	Play with baby		Movie, television

SUNDAY SCHEDULE

A. M.

6:00	Turn on heat Arise and dress	9:00	Dress for church Wash dishes Dress baby
7:00	Dress Prepare breakfast Sprinkle clothes Clean room	9:30	Sunday School lesson Teach class Dress for church
8:00	Read paper Breakfast Feed father Wash dishes Make beds Study Sunday School lesson Arise	10:30	Church Play organ
		12:00	Dine out Prepare dinner

P. M.

1:00	Read Sleep Dinner Feed father Wash dishes Radio Put baby to bed	5:00	Study extension Visit grandmother
		6:00	Supper Radio and play with baby Visiting Wash dishes Feed father Television Walk dog
2:00	Read Sleep Iron son's clothes Read Sunday paper Wash dishes	7:00	Reading and visiting Planning for next week Radio, church, canasta Eat left overs from dinner Wash dishes and television
3:00	Driving Visiting Reading Wash dishes Straighten up house Television	8:00	Planning for next week Radio, church, movie Church, bathe baby and put to bed Church and Young People's Meeting Television
4:00	Visiting Driving Radio Television Study extension Read Sunday paper Visit grandmother	9:00	Planning for next week Church Radio, visit with husband Fix fires for the night Put girls to bed Movie and bed
5:00	Prepare supper Radio Visiting	10:00	Bed, radio

A SIMPLE COURSE EVALUATION SCALE

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Introduction

ALTHOUGH teachers and administrators have long been aware of the need to evaluate courses to determine the effectiveness of methods, teachers, and materials utilized in the curriculum, there still exists a demand for methods of evaluating college-level courses. (4) Among other endeavors to meet this demand one of the most promising is the large scale program of evaluation in the General Education movement under the leadership of Dr. Paul Dressel. The results of this program should be of value to those in and out of the General Education movement. (6)

The evaluation scale described in this article was originally constructed on the basis of the general need for evaluation mentioned above as well as in answer to personal needs of an instructor. Other scales have been developed which are more adequate from some standpoints; Amatora's (1) technique for evaluating teachers for example, could be generalized beyond the grade school level on which it was standardized. The value of the scale presented here has been found to reside in its simplicity, its ease of administration, its production of frank judgments on the part of students, and to some extent its statistical manipulability.

Any college or university class which employs some combination of lecture and discussion methods can use the scale. And any teacher can get the trends represented in his class if he knows how to take a mean and standard deviation. The writer has utilized the technique over a period of several years and in two different school situations. Also, a group of teachers in an area of General Education employed it to make statistical comparisons among their various classes. Other individual teachers have made use of it.

The scale is administered as a separated addendum to the final examination. That is, the sheet containing the scale is handed out immediately after the final examination is distributed with the request that students fill it out, but that they place the sheet in a separate pile and in different order from the examinations. Emphasis is laid on the necessity for, and precautions are taken to preserve, anonymity. In the section on "Qualitative Uses" a further statement is made concerning the frankness of expressed feelings obtained by the scale under these circumstances.

Recognition is fully accorded to the need for other forms of course evaluation. The present scale is offered as only one means of evaluation, albeit an important one, the student's frank rating of important factors in the course.

The Scale

Graphic rating scales have been found to be satisfactorily reliable and easy to use. (5, 7) The "Student's Evaluation of Course" is a simple graphic rating scale with students acting as "judges." Figure 1 presents the latest revised version of the scale. When a supplementary text is employed, a third item between Numbers 2 and 3 has been included. (See page 147.)

Also, in item Number 6 (Number 7 if the supplementary text item is included) the statement was changed for one term to: "The course has made a change in my philosophy of life." From student comments the wording in Figure 1 appears to be preferable.

On the whole, the use of an invitation to make comments, following item Numer 6, has proven to be more productive than merely leaving the space blank with no suggestion.

Items Numbers 4, 5, and 6 are purposely set up to indicate a balance if the student feels the course is balanced. Varying of the "most favorable" point is also intended to avoid the tendency to make a mark on each line at about the same place. The influence of the totality of the course and the instructor cannot help being felt from one item to another, though the "halo effect" appears to be less than might be expected in such a scale as this one. (See section on "Quantitative Uses.")

Though the writer is aware that the scale as set up violates several principles considered best for rating scales (5), in particular, using definite marks along the rating line, and not having descriptive phrases between the extremes, the purposes of the scale were held more important than these considerations. It was thought, possibly unjustifiably, that the use of marked points would encourage use of any part of the scale rather than just the white space in the middle. And since the scale is meant for a quick expression of feeling at the close of the final examination when time is of the essence, the fewest descriptive phrases

* The author wishes to express his thanks to the Psychology Seminar of Florida State University, and especially to Dr. Theron Alexander, Jr., Dr. Howard Baker, and Dr. Anders Sweetland, for helpful suggestions and criticisms.

Student's Evaluation of Course

Name of Course_____

Please give your best judgment on the following items. Do NOT sign your name. Check on each scale where you feel the right place of emphasis is.

1. The material presented in the course as a whole is:

   Very helpful — Not helpful at all

2. The Text is:

   Very helpful — Not helpful at all

3. The lectures are interesting or not:

   Stimulating — Very dull

4. The amount of work required for the course was:

   Too little — Too much

5. The balance between lecture and discussion has been:

   Too much lecture — Too much discussion

6. The course has made a change in my thinking or philosophy of life:

   Profound change — No change at all

FEEL FREE to use the space below to make comments on any of the above questions:

Figure 1

Sample of the Evaluation Scale

(Centered on $8\frac{1}{2} \times 11$ mimeographed sheet. Division points are at each eleventh space.)

3. The Manual, Workbook, or Prospectus is:

Very helpful ——————————————— Not helpful at all

consonant with clarity had to be included.

An odd-numbered point scale has been questioned at times on account of an alleged tendency for scores to group toward the midpoint. This difficulty does not seem to be great in actual practice with this particular scale. In both the writer's and others' classes students have made their choices at the ends of the scale where they seem to feel their choices should be. Means of distributions have differed significantly from the midpoint again and again. In other research the writer has utilized an eight-point scale and has found no manifest differences between seven and eight points.

Scoring has been done in tenths of a point, ranging from 1.0 to 7.0. The score is taken where the point of the check-mark (√) or the crossing of the X (×) is found. Where the student has written a word or a group of words, rather than making a mark, the midpoint of the word or words has been scored; one is not confronted with this exigency very often. A suggestion is made by Guilford (5) that scoring units be smaller than scale units. No doubt, however, tenths of a point are too refined. Yet most students do not mark the scale compulsively at the points printed on it, so some smaller division than whole numbers is needed. A marking key has been utilized at times; estimation of tenths, however, fairly accurately determined without a key, is recommended, especially in light of the possible over-refinement of scoring units.

As far as the writer is concerned, this evaluation scale may be copied by anyone to be used in classes. If users care to report on their results, such a report will be appreciated in order to add to validational materials.

Quantitative Uses

Direction of Attitude—The first use which the writer found helpful is to determine the direction of attitude of a class. A mean or median, depending on the form of the distribution, can show where the class as a whole is tending. Standard deviations and ranges show how widely the group may differ from one another. A convenient adaptation of a bar graph helps here. Figure 2 gives an example of this kind of graph. It is easy to utilize one of the mimeographed evaluation sheets to exhibit mean, standard deviation, and range.

A suspicion may obtain in connection with items Number 1 and 3 that the "halo effect" could very easily operate. The course and the instructor may be read in terms of each other. Nevertheless, Pearson product-moment correlation coefficients between items Number 1 and 3 from two groups representing two different schools were .508 and .270 respectively, with the latter not significant. These correlations were in line with expectancy, since the first group consisted mostly of freshmen who would be expected to be less discriminating than the second group consisting of relatively mature students. Only twenty-five percent of the variance in item Number 1 is accounted for by variance in item Number 3 in the first group of students.

A bigger question may be asked, perhaps the most relevant one, "Does the scale actually show a difference of attitude from one situation to another?" That is, is direction of attitude actually differentiated, or do all classes in all situations mark the scale similarly? The answer is that it has shown significant differences among courses and between objectively varying situations.

The group of teachers mentioned in the Introduction found statistically significant differences among their courses.* Tables I and II present an analysis of variance of both courses in the General Education area involved. Table I gives the analysis of both courses together on all items, Table II of each course separately on item Number 1, the "overall item."

Even though, however, the scale does manifest differences where one might expect them to be found, it is consistent in respect to courses taught by the same teacher. In the group comparisons above, classes taught by the same teacher did not differ significantly from one another in spite of fairly large differences among classes taught by different instructors. In another case, in the fall of one year one teacher taught a course in Personal Development to freshmen mainly, a course in General Psychology to regular students in a university, sophomores and above, and another General Psychology course to an Air Force night class at an air base. As Table III indicates, no

* The variance on item Number 6 is usually considerably higher than on any other item. (Cf. Table I) Students may differ widely in their interpretation of this item, or are forced by the scale to make more discriminative judgments on this item. The item's validity may be questioned if the former alternative holds.

Student's Evaluation of Course

Name of Course_____

Please give your best judgment on the following items. Do NOT sign your name. Check on each scale where you feel the right place of emphasis is.

1. The material presented in the course as a whole is:

Very helpful ——— Not helpful at all

2. The Text is:

Very helpful ——— Not helpful at all

3. The lectures are interesting or not:

Stimulating ——— Very dull

4. The amount of work required for the course was:

Too little ——— Too much

5. The balance between lecture and discussion has been:

Too much lecture ——— Too much discussion

6. The course has made a change in my thinking or philosophy of life:

Profound change ——— No change at all

FEEL FREE to use the space below to make comments on any of the above questions:

Figure 2

Bar Graph Depicting Mean (vertical line), Standard Deviation (heavy bar), and Range (light bar) on Each Scale Item

TABLE I

ANALYSIS OF VARIANCE OF SCORES IN TWO COURSES ON ALL ITEMS OF SCALE

Item	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio*
1.	Between groups	68.63	8	8.58	6.86
	Within groups	571.20	458	1.25	
2.	Between groups	110.89	8	13.86	10.66
	Within groups	583.91	450	1.30	
3.	Between groups	110.57	8	13.82	12.68
	Within groups	481.37	443	1.09	
4.	Between groups	40.79	8	5.10	5.73
	Within groups	397.14	448	.89	
5.	Between groups	48.41	8	6.05	9.76
	Within groups	274.37	440	.62	
6.	Between groups	223.14	8	27.89	12.68
	Within groups	1002.98	455	2.20	

* All ratios in this column are significant at the 1% level.

TABLE II

ANALYSIS OF VARIANCE OF SCORES IN TWO COURSES ON ITEM NUMBER 1, COURSES SEPARATED

Course	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio*
A.	Between groups	33.97	5	6.79	4.96
	Within groups	388.62	284	1.37	
B.	Between groups	25.16	2	12.58	11.98
	Within groups	182.58	174	1.05	

TABLE III

ANALYSIS OF VARIANCE OF SCORES ON ITEM NUMBER 1 IN THREE CLASSES TAUGHT BY SAME TEACHER

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio*
Between groups	6.99	2	3.50	2.99
Within groups	164.88	141	1.17	

* Ratio is not significant.

significant difference showed up on item Number 1 among these exceedingly diverse groups.

Chronological Trends

While at any one time the scale is consistent for any one teacher, during the several years that the writer has employed the "Student's Evaluation of Course" trends have been manifested on the scale which are validated by the external circumstances. It was predicted that during the terms in which he was writing his dissertation the writer's scales would show a trend away from the normal, in particular, higher means on item Number 1. Figure 3 makes some case for the way in which the prediction was borne out.

Comparable classes across a period of a number of quarters and semesters gave mean scores which are represented in toto by a linear regression line with a slope of -.04. Without the mean score in the term devoted least to class preparation, the line has a slope of -.06. The first mean represents the first term the writer taught on a college level. The other means, apart from those in the dissertation period, show a consistent average. On the other hand, if one takes only the points between the first mean and the highest (which deviates from the others because of external circumstances, the author believes), the parabola which almost perfectly fits these points does seem to represent an actual trend of scores. The external situation is a verifiable one; the scores appear to follow the objective conditions. If the extrapolated means actually represent the trend, one can be thankful no further terms had to be devoted to dissertation writing.

Whatever function fits the points, the 2.86 at least appears to be out of place. A standard error of estimate calculated including 2.86 is .241; without 2.86 it is .158. In the latter case, 2.86 lies 3.675 standard errors of estimate above the predicted score, considerably beyond the one percent level of chance expectancy.

Group Comparisons

It is usually difficult to get teachers to have statistical comparisons made on their classes; nevertheless, the scale is useful for such purposes. Tables I and II offer examples of the possibilities here. It does seem that for the scale to be of full benefit here the teaching staff has to sit down with the results and face them honestly. Such a procedure was followed by the group of teachers mentioned previously. The results were presented as objectively, and diplomatically, as possible. Discussion included an explanation of the limitations of such scales as well as their values. Possibly most groups could not be as objective as this one was. If not all members of a staff agree on common discussion, an administrator with the consent and cooperation of his teachers could use the scale and keep its results confidential. Odious comparisons, first, and complete dependence, secondly, on any one form of evaluation, are, of course, to be avoided.

Qualitative Uses

It is of no help to the students involved, for they of necessity remain unknown; but on item Number 6 it is revealing to find there are a few in each class who check the very extreme at either end. From a clinical standpoint, these extreme scores usually mark some kind of instability. It may be that honestly a person has had such a profound change that he would mark all the way to the left; yet it is not ordinarily expected that anyone will so mark. If, however, a student marks all the way to the right, one can surmise that he is fighting against the teacher, the course, or both. Any honest appraisal of any course, it would seem, should include recognition of some slight change in one's philosophy of life. It is wholesome for a teacher to realize that there may be someone who has been influenced strongly enough to be very much moved for or against his course.

Validation of the honesty of the ratings, which to an extent is a validation of the scale itself, since the student is supposed to mark what he feels about the course, not what the objective value of the course actually is, is found in the written comments at the bottom of the page below the scale itself. Following are some examples taken from various courses:

"Regarding no. 5 particular teacher required 2, 2000 word research papers for a 2 hour course. All others required only 1." (This person meant Number 4.)

"This course was very stimulating."

"The time consumed in connection with the term paper is not worth the value received from the paper."

"The text is mediocre, gives many examples in place of explanations. Read too much to gain too little."

"Lectures were too deep for class."

"Enjoyed this course more than I do my other ones."

"I don't think that this course should be required."

"Good course—and good instructor!"

"The workbook was unnecessary. It only made me get mad at some of the questions I couldn't answer and took up too much time when the text was taking up enough."

"I feel that it was too general or hasty and it was a complete waste of time. I do not think I got much of anything from it."

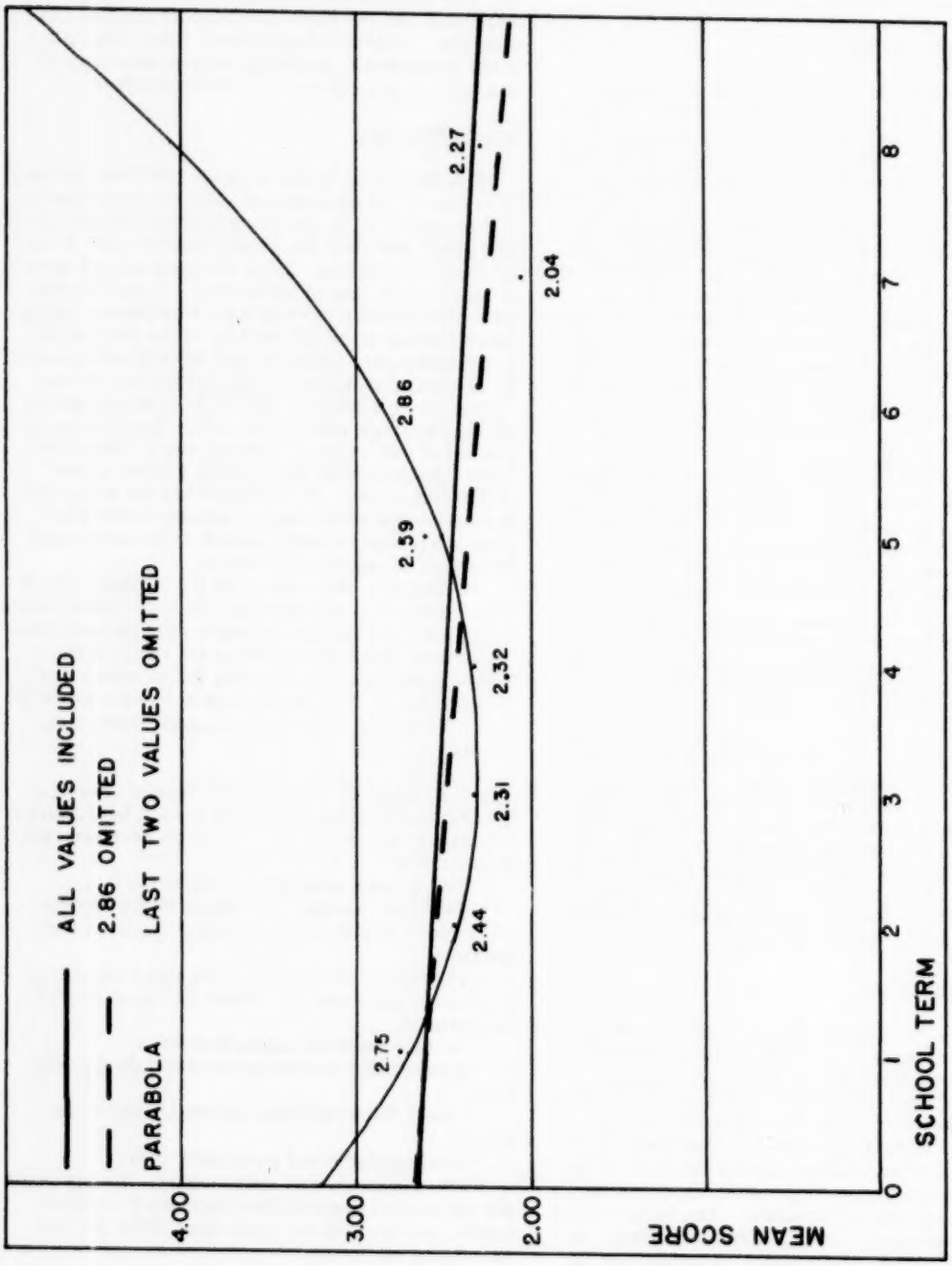

Figure 3

Regression Lines of Means for Eight School Terms

"I have enjoyed this course very much. Dr. Blank is very good a very intelligent person—a very pleasing personality."

Obviously, these students felt that their identity could not be established. There are enough of these comments in every set of scales to impress one with the student's belief that he is anonymous and can express himself honestly.

One advantage which cannot be directly measured, but may be inferred, is that students who have not had a chance to "gripe" are given a chance without fear of retaliation. On the other hand, those students who desire sincerely to express their appreciation for a course can likewise have their say without fear of being misunderstood.

Summary

A course evaluation scale has been described which is simple to use and to assess. Its quantitative uses are to show the direction of attitude of classes, chronological trends, and possibly group comparisons. Extremes of attitude can be found. The frankness of the use of the scale by students has been suggested.

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"RESISTANCE TO EXTINCTION" OF TWO PATTERNS OF VERBAL REINFORCEMENT

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THERE ARE apparent two broad classes of responses in the area of conditioning. Those responses, conditioned or unconditioned that are elicited by specifiable stimuli are called respondent (Pavlovian conditioning). The other class, comprising all those responses that are emitted more or less independently of identifiable stimuli, may be referred to as operant.

Clearly, most of our behavior in the routine affairs of everyday life is operant, in that it operates or acts upon the environment to produce the satisfaction of basic "needs." Respondent behavior is much less commonly observed and seldom, if ever, operates upon the environment to produce anything.

Skinner (1938) worked exclusively with the rat, reinforcement depending upon the rat pressing the bar in the Skinner-box apparatus. Bar-pressing in this situation is an operant. It occurs with a low frequency prior to any experimental procedures that may be applied. Its strength is increased when it is followed by reinforcement. Increased strength means merely that it occurs with higher frequency than it did before.

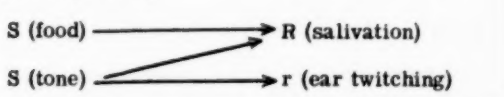
Probably the best measure of operant strength is frequency of occurrence. An operant is strong when emitted often within a given period of time; it is weak when emitted rarely.

A paradigm suitable for Type R conditioning is shown, along with the familiar Type S schema. A comparison of the two will help clarify some of the ways in which the two types differ. (For the purpose of this paper let us assume a two-factor theory as do Skinner and Mowrer. Hull (1943) disputes the theory that there exists two types of learning. Fundamentally, Hull attempts to handle both under his set of postulates.)

Type R: (Skinner)

s. . . . R (bar pressing) → S (food) → R (eating)

Type S: (Pavlov)



Type S conditioning involves the elicitation of a response (salivation) by an identifiable conditioned stimulus (tone) that is under the experimenter's control. In Type R conditioning, the specific stimulus that initially evokes the response (bar pressing) cannot be identified. This is indicated by the small s of the Type R paradigm.

For all practical purposes, the response is initially emitted, without recourse to any specific stimulus source.

Type S conditioning involves stimulus substitution and the formation of a new reflex. The tone, in the classical Pavlovian example, comes to act as a "substitute" for food in eliciting salivation; and tone-salivation is the new reflex. In Type R conditioning, however, there is merely the strengthening of a reflex that already exists in the organism's repertory. Bar-pressing, for example, occurs in a Skinner-box with some frequency prior to any reinforcement with food. At any rate, no substitution is involved and no new stimulus-response relation is formed.

This brings us to a focal point in educational research. At least one educational psychologist (Stroud, 1951) has recently made more than passing reference to the need for a systematic behavior theory in education, as follows:

> Undoubtedly, one of the pressing needs in our field is a comprehensive learning theory (or behavior theory) that will encompass teaching and learning in school and embrace the broad phenomena of personality and adjustment..... A frank attempt to extend the current learning theory of Hull, Tolman, or others, to learning in school is overdue... (p. 282)

On the other hand, Brownell (1948) points out the futility of attempting to base school practice on any contemporary learning theory. The school situation, according to Brownell, involves interaction of many factors, and so does not follow the simple model of the laboratory experiment. Brownell also stresses that educational psychology is not an attempt to apply psychological learning theory to education; rather, research must

*The author wishes to express his gratitude to both Dr. Wendell W. Wright, Dean, School of Education, and Dr. Nicholas Fattu, Director, Institute of Educational Research, Indiana University, for their continuing support of basic experimentation.

develop educational principles out of studies of real school problems in their natural complex setting.

It is evident, however, that the theoretical-experimental psychologist who utilizes infrahuman organisms and performs operations on them, does not, indeed, observe them in their natural complex setting. Actually, many investigators favor the results of relatively simple experiments upon infrahuman organisms as the principal inductive base for learning theory. This preference is not due to any over simplified belief that all of the principles which may eventually be needed to account for complex behaviors can be derived from these experiments, but rather to a conviction that only from these experiments can there be confidence that the effects of different variables have been isolated. Thus it is difficult to believe that the beginnings of an adequate theory can take root from anything but an exhaustive analysis of experimentally isolated situations. With respect to educational theory then, it appears to be contingent upon the educational psychologist to utilize testable principles derived from infrahuman studies, and to perform operations upon human subjects in the relatively "simple" laboratory situations.

Although the stated educational aims are directed toward explaining how human organisms learn, there has been in vogue an emphasis upon educational tests. There are thousands of test titles, which the testers have limited their collection of facts to the marks put on the papers by persons being tested, and to the association of these marks with some criterion which usually has success in school as its only referent. Although the testing movement is highly useful and practical, it has, unfortunately, not contributed to psycho-educational theory. Indeed, it has not advanced our knowledge in explaining how the human learns.

Clearly, then, a behavior theory for education should take behavior as its datum. The primary nature of the paper is to suggest a direction for the experimental educators to proceed toward this goal.

There has been much work done with the white rat employing the concepts of 'reinforcement' and 'extinction'; unfortunately, there is a lack of systematic data on the human level.

Jenkins and Stanley (1950) point out that the regular reinforcement of response is, indeed, not the world's rule; and this leads us into an extremely interesting area. There are various schedules of reinforcement that can be administered in the laboratory; for the purpose of this experiment, however, only two were utilized: Continuous reinforcement and partial reinforcement. That is, every time in acquisition an S in the continuous reinforcement group gave a response belonging to the "correct" class, a "reinforcement" was received. In the partial reinforcement group, the Ss received reinforcements only 50 percent of the time, or for every other "correct" response. The reinforcement schedules apply only to the acquisition phase of the experiment. Once the acquisition criterion was reached each S was placed on 5-minute extinction. (Absence of reinforcement.)

In measuring the resistance to extinction, the ratio of the number of correct responses to the total number of responses for 5 minutes was used. The number of responses in a complete extinction is generally more satisfactory, since any short-time criteria excludes possibly important data contained in the rest of the extinction curve. On the other hand, extinction criteria have the advantage of being time-saving and experimentally convenient, and are therefore frequently employed.

Procedure

Upon entering the experimental room each S was told to read aloud the following printed instructions:

> The task in the experiment is a simple one. All you are to do is to continue saying out loud any numbers that you wish. It is important that you continue this operation until the experimenter tells you to stop. You will be told when the numbers you are saying are on the "right" track. Attempt to say the numbers at a pace that is normal for you.

Any questions that the Ss had were cleared up before allowing them to continue. Actually, then, the Ss were emitting verbal responses. It was decided beforehand to condition Ss to the response class "8". (Any number containing an eight in it.) The verbal reinforcer used was a "right" from the experimenter. The criterion used for conditioning was 20 serially "correct" responses. When the criterion was reached, each S was placed on a 5-minute extinction schedule. The basic data consisted of the number of correct responses made in extinction as compared with the total number of responses made. In testing for differences the question to be answered was whether the continuous reinforcement (Rc) group emitted a higher correct response ratio in extinction than the group receiving partial reinforcement (Rp).

Subjects

The 20 Ss used were taken from a course in Child Development in the School of Education at Indiana University. Participation in the experiment was a required assignment; this precaution was observed in order to eliminate additional biases which are found by asking for "volunteers".

TABLE I

RATIO OF THE CORRECT RESPONSES TO THE TOTAL RESPONSES FOR EACH S IN THE PARTIAL REINFORCEMENT GROUP DURING A 5-MINUTE EXTINCTION PERIOD

	Extinction in Minutes					
	1	2	3	4	5	Total
S_1	5/5	5/5	2/2	3/3	3/3	18/18
S_2	6/11	9/16	17/28	14/16	20/26	66/97
S_3	7/9	6/18	2/4	1/6	9/12	25/49
S_4	8/14	3/9	4/6	6/12	6/7	27/48
S_5	7/7	1/1	3/3	3/3	1/1	15/15
S_6	7/19	4/11	1/2	6/14	8/10	26/56
S_7	19/20	16/19	3/21	4/18	3/20	45/98
S_8	5/5	0/10	11/13	5/12	9/10	30/50
S_9	9/12	2/8	1/9	6/15	7/18	25/62
S_{10}	2/26	16/21	14/20	19/23	6/15	57/105
Correct	75	62	58	67	72	334
Total	128	118	108	122	122	598

TABLE II

RATIO OF THE CORRECT RESPONSES TO THE TOTAL RESPONSES FOR EACH S IN THE CONTINUOUS REINFORCEMENT GROUP DURING A 5-MINUTE EXTINCTION PERIOD

	Extinction in Minutes					
	1	2	3	4	5	Total
S_{11}	16/17	16/20	9/14	8/14	8/22	57/87
S_{12}	16/22	10/23	18/22	8/19	12/23	64/109
S_{13}	17/19	11/19	9/12	1/9	10/16	48/75
S_{14}	24/29	16/19	7/12	7/11	3/24	57/95
S_{15}	17/19	12/26	13/20	7/16	2/21	51/102
S_{16}	10/16	17/19	13/21	2/20	6/21	48/97
S_{17}	21/29	6/16	14/18	3/20	2/9	46/92
S_{18}	19/24	13/19	12/17	4/18	9/28	57/106
S_{19}	26/31	11/20	13/17	6/21	2/16	58/105
S_{20}	29/36	16/29	14/28	2/15	4/19	65/127
Correct	195	128	122	48	58	551
Total	242	210	181	163	199	995

TABLE III

FREQUENCY OF FAILURES AND SUCCESSES FOR THE TWO GROUPS DURING FIVE-MINUTE EXTINCTION PERIOD

	Failure	Success	Total
Partial Reinforcement	264	334	598
Continuous Reinforcement	444	551	995
Total	708	885	1593

The age range was from 19 to 23 with a mean age of 20.6.

Results and Discussion

Table I presents the ratio of correct responses to the total number of responses for the Partial Reinforcement group during a 5-minute extinction period.

Table II, in like manner, presents the extinction data for the group which received continuous reinforcement during acquisition.

Figures 1 and 2 compare the plot of the mean correct responses in extinction with the mean total responses in extinction for the partial reinforcement (Rp) and continuous reinforcement (Rc) groups respectively. Figure 3 shows the plot of the percent of correct responses in extinction for the two reinforcement schedules.

Clearly the design encountered in this investigation involved a comparison between two frequencies or more precisely two proportions. A group of twenty Ss was divided at random into two groups of ten Ss. One group was given partial reinforcement in the acquisition stage and the other group, reinforcement on each correct trial. After conditioning both groups to a comparable criterion (twenty serially correct responses containing a number "8") each S was placed on 5-minute experimental extinction to determine whether the conditioned response under investigation occurred proportionately more frequently in one group or the other. The appearance of the conditioned response during the extinction period can be designated as a success. The appearance of an inappropriate response in extinction may be called a failure. (Any number or set of numbers that does not include "8".) The hypothesis to be tested then is that the two samples are random samples from a common population, and a Chi square test was used to evaluate the outcomes of the experiment. Table III shows the frequency of success and failures for the two groups during the 5-minute extinction period.

The obtained Chi square value of 3.29 falls barely short of the required 3.84 to be "significant" at the .05 level. The trends of the extinction curves are indicative, however, that, if the extinction criterion of five minutes was extended the "correct" response differential between groups would have approached a higher significance level. (See Figure 3.)

Analysis of the data indicate that:

1. Partial reinforcement increases the resistance of a response to extinction and appears superior to continuous reinforcement in this respect.

2. The extinction curve following continuous reinforcement starts with an initial spurt in percent of correct responses. Afterwards, the extinction curve is marked by depressions and accelerations in responding. (See Figure 3.)

3. Not only is extinction after partial reinforcement more resistant, but the curve is also smoother than that after continuous reinforcement. The vascillations which come after continuous reinforcement do not occur so markedly after partial reinforcement.

Although the investigation described was relatively simple the analogue to many complex human behaviors is implied. For instance, the greater smoothness of extinction for the Partial reinforcement group might indicate that this "schedule" of conditioning may perhaps increase a person's "frustration tolerance." Intrinsic to partial reinforcement is the recurrence of periods of non-reinforcement during which "frustration" is alternately experienced and overcome by continued responding. Occasional reinforcement gives stability to behavior, and "persistence" in the face of failure.

Let us take a concrete example from the experiment just described. Eventually each S in both groups in the process of emitting numbers responded with a number containing an "8". The group (Rc) was told "right" every time they had responded with a number of the correct class (containing an "8"). The acquisition here was rapid, and as reported in a previous section, the criterion for acquisition was twenty serially "correct" responses. (Those containing an eight.) Remember that this group received a reinforcement ("right") each time they emitted the correct response. The partial reinforcement group was told "right" only 50 percent of the time they emitted the correct response. For example, the procedure was as follows: Each S would eventually give a number containing the required "8", a typical report being, — S says "38", E says "right"; S says "48", E is silent; S says "58", E says "right", ...and so on. In this manner the Ss in the Rp group do not meet with success on every correct response, and build up a persistence to failure.

The obtained results clearly suggest a fruitful direction for a behavior theory of education. With the facts of reinforcement "schedules" we now have (Humphreys, 1943; Jenkins and Clayton, 1949; Mowrer and Jones, 1945) some intelligent predictions concerning educational procedures with respect to the control of limited behavior can be made. Extrapolating somewhat, it should

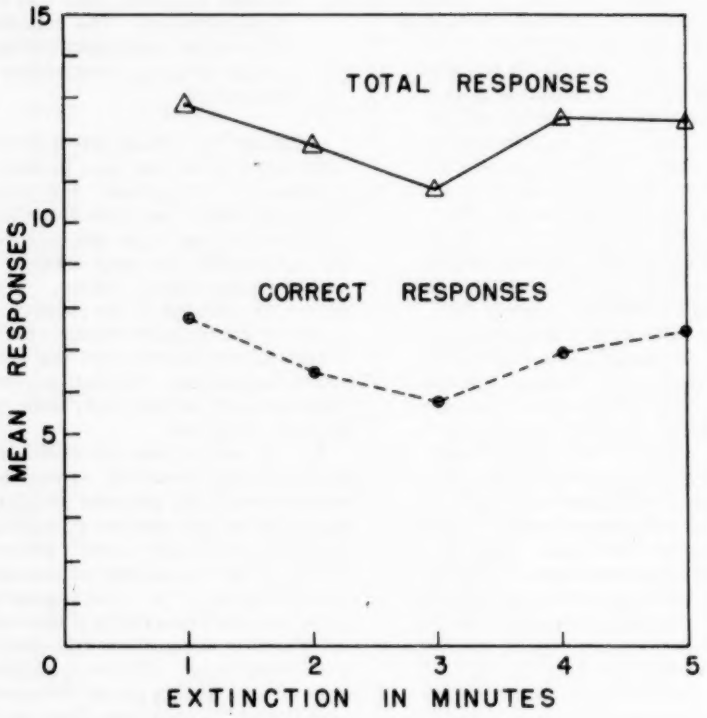


Figure 1

Extinction Curves Comparing the Mean Correct Responses to the Total Mean Responses for the Partial Reinforcement Group

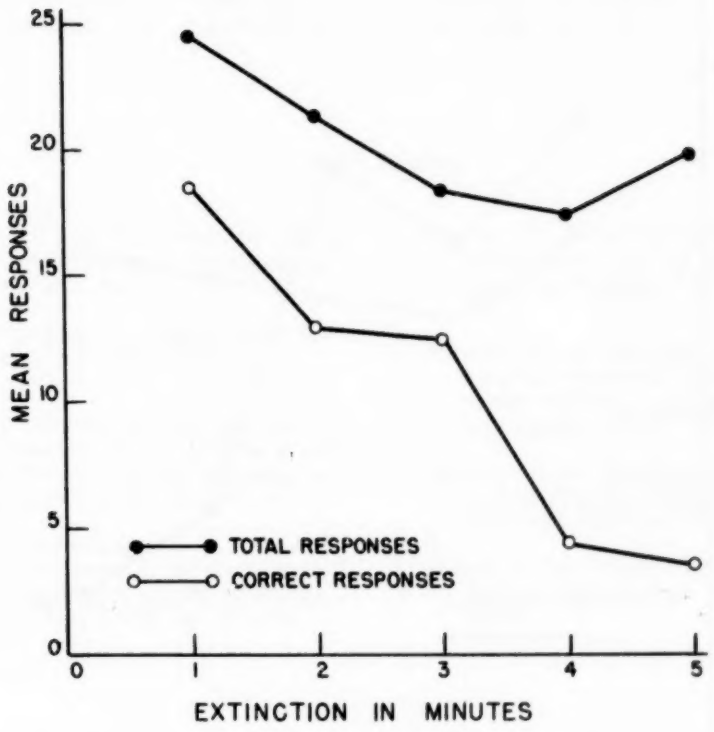


Figure 2

Extinction Curves Comparing the Mean Correct Responses to the Total Mean Responses for the Continuous Reinforcement Group

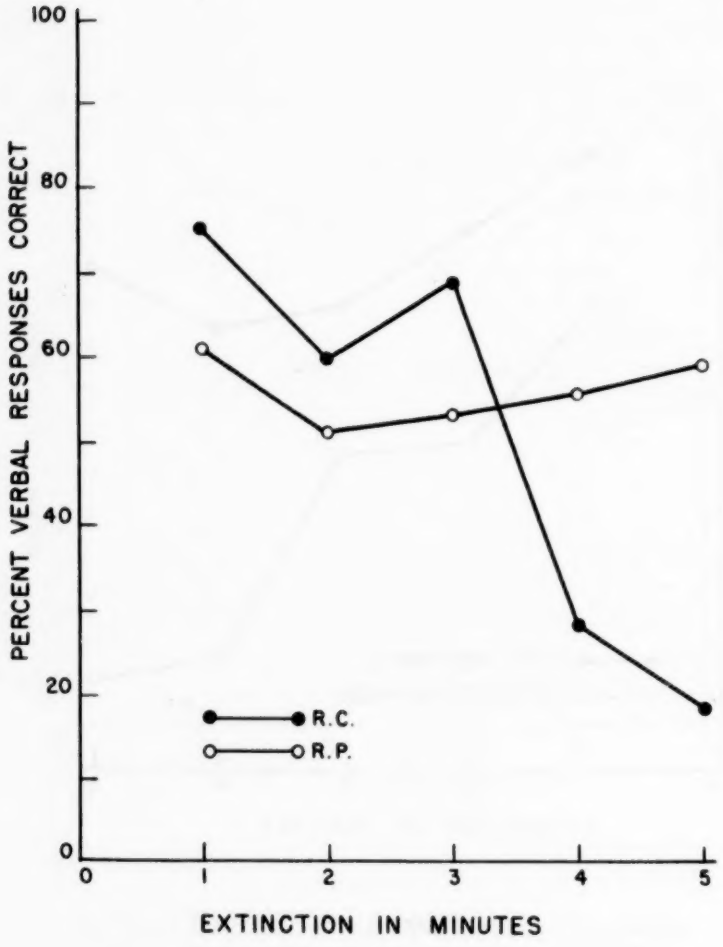


Figure 3

Plot of the Percent Correct Responses for Each Minute in Extinction for the Two Reinforcement Patterns

be seen how one would go about teaching a pupil to be persistent in the face of failure. In training for skill, for confidence at work, or for willingness to persist in social activities, the teacher should insure that each child is guaranteed some measure of success and approval regularly at first, but later only occasionally, so that he will not give up in the face of setbacks. Outside the laboratory continuous reinforcement is by no means the rule, but neither is strictly partial reinforcement. There are more complex 'schedules' of reinforcement (Skinner, 1938) such as fixed-interval and fixed-ratio. It is hardly to be expected though, that any schedule adhering to a fixed number of responses would be honored by our complex social environment. Also, it is not the purpose of the present paper to discuss the relative efficacy of aperiodic, periodic, or regular reinforcements in producing behaviors that are resistant to extinction as much of the experimentation has been done with infrahuman organisms. There is, however, no reason why experimentally oriented educators should not begin a systematic investigation of these operant phenomena on the human level

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ADDENDA

The following are corrections to Victor Mech's article which is published in this December, 1953, JOURNAL OF EXPERIMENTAL EDUCATION, entitled "Resistance to Extinction of Two Patterns of Verbal Reinforcement." The insertions are underlined, and quotation marks should have been used as indicated.

* * * * *

The lines including "those responses conditioned or unconditioned. . . . are called respondent" should be in quotes and preceded by, Keller and Schoenfeld (1950, p. 49) indicate that:

The lines including "the other class comprising. . . . of identifiable stimuli" should be in quotes and preceded by, Keller and Schoenfeld (1950, p. 49) point out further:

The lines including "most of our behavior in the routine affairs of everyday life. . . . operates upon the environment to produce anything" should be in quotes and preceded by the following sentence, In discussing the relative frequency with which both types occur in life situations, Keller and Schoenfeld (1950, p. 49) state:

The lines including "it occurs with a low frequency prior. . . . increased strength means merely that it occurs with higher frequency than it did before" should be in quotes and preceded by, With special reference to this concept Keller and Schoenfeld (1950), p. 50) state:

The phrase, It is pointed out by Keller and Schoenfeld (1950, p. 50) that, should precede the quote "probably the best measure of operant strength is frequency of occurrence. . . . it is weak when emitted rarely."

The sentence beginning, "A paradigm suitable for Type R. . . ." should have been, "A paradigm suitable for Type R conditioning is shown by Keller and Schoenfeld (1950, pp. 47-48) along with the familiar Type S schema."

The paragraph beginning "Type S conditioning. . . ." and ending with "the small s of the Type R paradigm." should have been in quotes and preceded by Keller and Schoenfeld (1950, p. 48) describe the differences between Type S and Type R as follows:

The sentence beginning, "For all practical purposes. . . ." should be preceded by, With respect to the Type R response, Keller and Schoenfeld (1950) point out that

The sentence "Type S conditioning involves stimulus. . . . of a new reflex " should be in quotes and preceded by Keller and Schoenfeld (1950, p. 48) state:

The sentence, "The tone, in the classical. . . . is the new reflex" should be preceded by, Keller and Schoenfeld (1950, p. 48) indicate further that:

The lines including "In Type R conditioning, however, ... stimulus-response relation is formed" should be in quotes and preceded by, A further distinguishing property of operant conditioning is pointed out by Keller and Schoenfeld (1950, p. 48) as follows:

The sentences "This preference is not due to any oversimplified belief. . . . exhaustive analysis of experimentally isolated situations" should be deleted and corrected to read, "A primary reason for the foregoing preference is that the probability of control over the variables being manipulated is increased, thereby permitting a more valid interpretation of the obtained results."

The sentences "The number of responses in a complete extinction. . . . and are therefore frequently employed." should be in quotes and preceded by, The ideal conditions for extinction are discussed by Keller and Schoenfeld (1950, p. 72) who state:

The first and second conclusions under Analysis of the data, should be changed to read:

1. Fifty percent verbal reinforcement increases the resistance of a response to extinction when compared with 100 percent verbal reinforcement.

2. The performance curve in extinction following 50 percent verbal reinforcement is more stable than the extinction curve following 100 percent verbal reinforcement.

The sentence "Intrinsic to partial reinforcement is the recurrence.... and overcome by continued responding" should be in quotes and preceded by Keller and Schoenfeld (1950, p. 91) point out that:

The sentence "Occasional reinforcement.... in the face of failure" should be in quotes and preceded by, An application to the training of children is made by Keller and Schoenfeld (1950, p. 91) who state:

The sentence "In training for skill, for confidence at work.... so that he will not give up in the face of setbacks" should be deleted and the following substituted: "With regard to building persistence in children, Keller and Schoenfeld (1950) state, 'One would make sure, in training for skill, for confidence at work, or for willingness to persist in social activities, that the child is guaranteed some measure of success and approval—regularly at first, but later only occasionally.'"

The sentence "Outside the laboratory.... is strictly partial reinforcement" should be preceded by Keller and Schoenfeld (1950, p. 98) caution that

The sentence "It is hardly to be expected though.... by our complex social environment" should be preceded by Keller and Schoenfeld (1950, p. 98) point out further that

Add to the references:

Keller, F. S., and W. N. Schoenfeld, Principles of Psychology (New York: Appleton-Century-Crofts Co., 1950).

CORRECTIONS FOR

"The Statistical Interpretation of Degrees of Freedom"

by

William J. Moonan

The Editor and author are sorry for the statistical and typographical errors that appeared in the article as published in the March 1953 issue of the Journal of Experimental Education.

Page	Column	Printed line or equation number	Correction
259	1	30	applications
259	2	19	$Y_1 + Y_2 = y_1$
260	1	(1)	$-\frac{1}{2} \neq 0$
260	1	13	$Y_1 = \frac{1}{3} y_1 + \frac{1}{3} y_2 + \frac{1}{3} y_3$
260	2	(5)	$\begin{Bmatrix} Y_1 \\ Y_2 \end{Bmatrix} = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} \begin{Bmatrix} y_1 \\ y_2 \end{Bmatrix}$
260	2	39	Y_1 as Y_1
261	1	(7)	$\frac{(\frac{1}{3} y_1 + \frac{1}{3} y_2 + \frac{1}{3} y_3)^2}{(\frac{1}{3})^2 + (\frac{1}{3})^2 + (\frac{1}{3})^2} = \frac{(\sum_{i=1}^{3} y_i)^2}{3}$
261	2	8	$Y_1 = \frac{1}{n_1} y_{11} + \ldots + \frac{1}{n_1} y_{n_1 1} + \frac{0}{n_2} y_{12} + \ldots + \frac{0}{n_2} y_{n_2 2}$
261	2	10	$Y_2 = \frac{0}{n_1} y_{11} + \ldots + \frac{0}{n_1} y_{n_1 1} + \frac{1}{n_2} y_{12} + \ldots + \frac{1}{n_2} y_{n_2 2}$
261	2	19	$\frac{(\sum_{i=1}^{n_1} y_{i1})^2}{n_1}$
261	2	(11)	Change: y_{ik} to y_{ij}
261	2	24	$n_1 + n_2 - 2$
261	2	27	$n_1 + n_2 - 2$
261	2	33	$Y_1 = \frac{1}{n} y_1 + \frac{1}{n} y_2 + \ldots + \frac{1}{n} y_n$
262	1	(12)	$[\sum_{i=1}^{n} (X_i - \overline{X}) y_i]^2$
262	1	23	delete: $=i=1$
262	1	31	$= \sum_{i=1}^{n} (y_i - \overline{y}_i)^2$
262	1	34	Change: and y to and $\overline{y}$
262	2	17	$a_2 = (\frac{1}{3}, -\frac{1}{3}, \frac{0}{3})$, $a_3 = (\frac{1}{3}, \frac{1}{3}, -\frac{2}{3})$
263	1	15	$2^2 + 6^2 + 13^2$
263	1	22	$\begin{Bmatrix} 210 & 156 \\ 156 & 209 \end{Bmatrix}$
263	1	27	$j = 1, 2, 3.$

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